# Variability in the reporting of baseline characteristics, treatment and outcomes in esophageal atresia publications: a systematic review

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**Contributions**

The study was designed by NT, RW, JB and SE. Inclusion and exclusion criteria, assessment strategy, and the utilized Excel-based data extraction framework were developed by all authors. NT developed the search strategy, and NT, JB, and SE were responsible for screening, as well as data extraction and analyses. NT and JB drafted the manuscript which was revised by SE; all authors read, provided feedback, and approved the final manuscript.

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## INTRODUCTION

With approximately one new case in 3000 to 4000 births, esophageal atresia (EA) – with or without tracheoesophageal fistula – is a rare congenital anomaly, which requires surgical repair during the neonatal period.[1] Survival rates of EA patients have improved remarkably over the last decades of the 20th century and have since remained stable, with the probability of survival depending mainly on the presence of additional anomalies or chromosomal or genetic syndrome diagnoses such as VACTERL association.[2,3] Because of the improved survival, the focus of EA research has shifted from mortality to parameters such as long-term outcomes, and quality of life for EA patients, as well as quality of care.

However, the evaluation and comparison of (quality of) EA care between hospitals, regions or even countries through clinical audits is made difficult by the lack of standardization of measured process indicators and clinical outcomes. The current implementation of an European clinical audit for esophageal atresia care necessitates the generation of an overview of all possible outcomes described in EA research, as well as patient characteristics and treatment- and care process characteristics to - in time - be able to correct for case mix in (quality of) care comparisons.[4]

EA research is equally hindered by a lack of standardization of measured outcomes. As EA is rare, prospective trials with adequate patient numbers are generally even more rare. Best practice and "gold standard" in EA care is mainly based on expert consensus.[5,6] The significant increase in the number of publications on EA over the last

decades could potentially contribute to more evidence-based practice,[7] but overarching comparisons of results - such as meta-analyses - are difficult because measured outcomes and their corresponding definitions and manner of reporting widely vary. A core outcome set would enable such comparison of published research, and is under development (OCELOT).[8]

Hence a comprehensive overview of all possible EA outcomes, would be essential in the development of: (i) indicators (process, outcome) for use in audits and registries to allow comparisons between centers, regions, care pathways etc. with appropriate case-mix adjustment; and (ii) a core outcome set for use in EA research.

The primary aim of this explorative systematic review was to create such a comprehensive list of all reported outcomes in recently published peer-reviewed research on the main EA care process, as well as the variability in utilization, definition and reporting thereof. The secondary aim was to identify and define patient characteristics, as well as treatment and care process characteristics that could enable future interpretation of comparison of (quality of) care and outcome results. For the purpose of this paper, the term ‘studied parameters’ refers to all patient characteristics, treatment- and care process characteristics and outcomes. To our knowledge, this is the first effort to create such a detailed summary of studied parameters in EA research.

## METHODS

This review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement and guidelines.[9] A broad search strategy for Medline, Embase, and the Cochrane Library was developed in collaboration with an experienced medical librarian of the Erasmus University Medical Center. The search was based on the search term 'esophageal atresia', combined with the following terms: 'morbidity' or 'mortality' or 'survival' or 'outcome' or 'complication'. Complete search strategies are provided in Supplementary File 1. The search was performed in September 2021.

### Inclusion and exclusion criteria

The search aimed to find all papers concerning any aspect of the main esophageal atresia care process, including surgical and non-surgical management. Hence, studies only focusing on the outcome of redo surgery were excluded. Subsequently, papers published before 2015 were excluded to warrant contemporaneousness. Lastly, non-English-language publications were excluded, as well as animal research and *in vitro* studies, case series with less than ten patients, editorials, letters, meeting abstracts and reviews, guidelines, and consensus statements.

### Selection process

NT and JB independently screened the titles and abstracts of all search results to evaluate eligibility on the grounds of reporting care for and management of patients with esophageal atresia. Subsequently, the full texts of eligible articles were screened on

relevance for the review. Any disagreement was discussed and, if necessary, resolved by SE. Reviewing authors were not blinded for the title, authors, or journal name.

### Data extraction, analysis, and results

An Excel-based framework facilitated data extraction. Similar studied parameters were categorized and, following agreement between NT and JB, merged into an overarching term. The most frequently reported parameters were noted in the framework. Uncommon parameters, those mentioned in less than 5% of papers, were noted in a separate file. If available, definitions of studied parameters were extracted and noted, as well as utilized standardized ways of assessing the parameters, such as medical scores, scales and questionnaires, if the result thereof was directly reported in the included publication. Estimates of the parameters themselves were not extracted nor interpreted, and the methodological quality of included publications was not assessed.

## RESULTS

### Included articles

The applied search identified 3577 publications. After removal of duplicates and limiting the results to those articles published after 2015, 818 articles remained, of which 209 met the inclusion criteria (Fig. 1). A summary of study characteristics of all included publications is presented in table 1. An individualized overview of included studies and corresponding study characteristics can be found in Supplementary File 2.

## Data extraction

Full-text analysis of the 209 included manuscripts identified 731 parameters described in at least one of the included publications, which were then categorized into three overarching categories: patient characteristics (n=128), treatment- and care process characteristics (n=338), and outcomes (n=265). As several parameters could arguably be included in more than one category (e.g. length of primary hospital stay; number of surgeries), categorization followed agreement between the first two authors. We further arranged the parameters by topic, such as comorbidities, primary treatment, specific complications and long-term outcome, to facilitate the comparison of variation in studied parameters within similar subjects. The complete lists of all identified and extracted patient characteristics, treatment- and care process characteristics, and outcomes are included in Supplementary Files 3 through 5.

## Extracted studied parameters

Of 731 identified studied parameters, 92 parameters were described in more than 5% of included publications. These studied parameters are listed in table 2. Patient characteristics mentioned in more than two-thirds of included publications were sex, gestational age, presence of a cardiac malformation, and birth weight. The type of esophageal atresia according to the Gross classification was mentioned in 74% of papers. The type of surgical repair was stated in 60% of included articles. All other primary (surgical) treatment characteristics were mentioned in fewer than half of included publications.

Anastomotic stricture was the most frequently described complication; i.e., in 72% of included publications, followed by anastomotic leakage (69%). Mortality rate was reported in 66% of included publications. Length of primary hospital stay and duration of follow-up were mentioned in only one-third of articles (37% and 39%, respectively). In general, definitions of studied parameters varied widely between publications, rendering the extraction of unambiguous definitions impossible.

Variability in utilized standardized instruments to measure parameters such as quality of life was equally wide. To illustrate, health-related quality of life was described in 16/209 publications (8%), using twelve different tools or instruments. Other long-term outcomes, such as (motor) development, cognitive functioning, and behavior, were mentioned less often, yet the variability of used assessment tools was comparably large. A list of standardized scales, scores or instruments that were used in included publications to assess these outcomes is displayed in table 3.

## DISCUSSION

To the best of our knowledge, this is the first systematic review that summarizes all parameters studied in recent clinical research on esophageal atresia. More than 730 different patient characteristics, treatment characteristics and outcomes were identified in 209 included publications, demonstrating substantial variation in research interest and reporting. However, most of the parameters were mentioned solely in a handful of papers. Of 265 identified outcomes, only 5 (2%) were mentioned in more than 50% of included publications. The proportions of patient characteristics (5/128, 4%) and

treatment- and care process characteristics (1/338, <1%) that were studied and reported in more than 50% of included publications, proves to be similarly small. Additionally, studied parameters were defined and assessed inconsistently across included publications, thereby impeding comparison and benchmarking of parameters, even if they were more frequently studied.

In addition to generating an extensive list of all studied parameters, our study reveals several noteworthy observations. First, as expected, most studies were retrospective cohort studies, which emphasizes the need for more prospective studies (audits, registries, research studies, randomized trials) to establish best practice. Second, the studied parameters mainly refer to primary surgical repair of esophageal atresia and its complications. Although some studies addressed long-term outcomes such as follow-up and transition programs or long-term complications,[10–16] the complete list of parameters suggests that the esophageal atresia research of recent years generally had a short-term focus. By contrast, a recent overview of publication trends and global collaborations on esophageal atresia research found particular interest in the long-term outcome, surgical techniques, and epidemiology when assessing key points of the ten most-cited EA publications since 1945.[7] Thus, there is a mismatch between the short-term focus of the large majority of EA research versus the long-term outcomes that professionals and advocacy groups deem most important. Obviously, the reporting of short-term outcomes is easier than the reporting of long-term outcomes, for sequelae such as motor/neurodevelopment, chest wall deformities, chronic respiratory diseases, and lung function impairment often occur later in childhood or adolescence – and thus

require longer follow-up. The third remarkable trend is that only eighteen studies described quality of life outcomes through patient-reported outcome measures (PROMs), and the applied instrument varied across the studies.[10,12–14,17–27] The most used PROM was the generic, child-specific PEDS-QoL, which, however, was mentioned in only 8/209 papers (4%). This scarce use of PROMs is surprising, as there is a general movement to patient-centered care and PROM research across the medical world. This scarce use could possibly be attributed to the lack of a disease-specific PROM during the study period. Meanwhile, an EA-specific PROM for children has been developed in Sweden and Germany and is currently being validated in other countries.[28] Additionally, an EA-specific PROM for adults is being developed and validated in a Dutch nationwide study.[29] Lastly, although the large variety of studied parameters reflects attention for comorbidity and quality of care, mortality remains one of the most reported ones in recently published research.

Our study has some limitations. First, to warrant contemporaneity of results, reports published before 2015 were excluded. It is possible that extension of the time period to include earlier years would have yielded further outcomes that were not included in our review; it would also have potentially allowed an analysis of trends over time. However, on balance it was felt that the 466 different patient- and treatment characteristics and 265 outcomes from 209 publications were representative of current practice. Additionally, non-English publications were excluded, which may have led to underestimation of the variation in studied parameters, considering that geographical differences and local practices could influence the selection thereof.

The extensive list of studied parameters resulting from this systematic review, will serve as the foundation of projects aimed at standardizing EA data collection. Clinical audits or registry-based research will benefit from standardization of data regarding patient characteristics and characteristics of treatment and care processes, enabling further interpretation and correction of measured variation in outcome.
Additionally, these datasets must enable comparison or benchmarking between medical centers, thus be able to capture between-hospital variation and reflect (good) care. This review was undertaken as the first stage of defining a “Core Indicator Set” for data collection within the EPSA/ERNICA EA registry, which has the aim of improving EA care across Europe.

Although also aiming to improve patient care, the intention is somewhat different from that of a Core Outcome Set, which is “*an agreed standardized set of outcomes that should be measured and reported, as a minimum, in all clinical trials in specific areas of health or health care*.” The focus of a core outcome set is on trials and therefore the outcomes by which different treatments can be compared. As an example of the distinction between core indicator sets and core outcomes sets, we can take examples from our literature review. The number of patients having intra-operative bronchoscopy may be an interesting and useful process indicator to look at variation across European centers (and may be represented in a core indicator set) but it is unlikely to become part of a Core Outcome Set. Anastomotic leak, on the other hand, might be selected for both a Core Indicator Set and a Core Outcome set, as it is relevant to both the variation

between centers (e.g. leak rate in center X vs. others) and might also be useful to compare different treatments (e.g. thoracotomy vs. thoracoscopy). The application of core outcome sets has become increasingly important to achieve consistency of outcome reporting, with consideration of patients' perception of the importance of outcomes.[30] Defining a core outcome set for EA is already underway (OCELOT).[8] Core outcome sets often suffice to interpret differences between study arms in RCTs, in which baseline-characteristics are balanced, and treatment pathways protocolized.

To ensure recognition and implementation of both core data sets by everybody involved in esophageal atresia care and research, it is of utmost importance to involve all stakeholder groups (health care providers, patients, and researchers) in both endeavors.

## CONCLUSION

This review found substantial variability in reported patient characteristics, treatment- and care process characteristics, and outcomes in research regarding the main care process for patients with esophageal atresia. The resulting list of studied parameters could aid in the development of a standardized core outcome set, as well as a core indicator set. Standardized measurement and reporting is necessary to invoke less reporting bias, more interpretable results, and the possibility of more cross-study or cross-healthcare comparisons, which could significantly improve future outcome measurement and reporting in esophageal atresia care, as well as esophageal atresia research. The development and validation of both the standardized core indicator set

and core outcome set has started in 2021 with involvement of European expert health care providers as well as patient representatives.

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## LEGENDS OF FIGURES AND TABLES

**Figure 1.** PRISMA Flowchart: systematic review of studied parameters in esophageal atresia research

**Table 1.** Study characteristics of included publications

**Table 2.** Identified studied parameters in EA research

**Table 3.** Identified tools/instruments utilized and reported in one or more included publications

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## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

**Table 1.** Study characteristics of included publications

| | | n = | % |
|---|---|---|---|
| **Originated in** | Africa | 8 | (4%) |
| | Asia | 49 | (23%) |
| | Europe | 87 | (42%) |
| | North-America | 44 | (21%) |
| | Oceania | 10 | (5%) |
| | South-America | 2 | (1%) |
| | Intercontinental | 9 | (4%) |
| **Study design** | Retrospective | 148 | (71%) |
| | Prospective | 21 | (10%) |
| | Cross-sectional | 37 | (18%) |
| | Mixed design | 3 | (1%) |
| **Type of study** | Observational | 119 | (57%) |
| | Comparative | 90 | (43%) |
| **Study design** | Cohort | 198 | (95%) |
| | Case-control | 8 | (4%) |
| | Trial | 3 | 1% |
| **Year of publication** | 2015 | 19 | (9%) |
| | 2016 | 23 | (11%) |
| | 2017 | 36 | (17%) |
| | 2018 | 27 | (13%) |
| | 2019 | 23 | (11%) |
| | 2020 | 35 | (17%) |
| | 2021 | 46 | (22%) |
| **Included type of EA** | Only type A[a] | 2 | (1%) |
| | Only type C[a] | 31 | (15%) |
| | Only type E[a] | 4 | (2%) |
| | Long gap[b] | 10 | (4%) |
| | Multiple types[a] | 31 | (15%) |
| | All types[a] | 129 | (62%) |
| | Other[c] | 2 | (1%) |

[a]According to Gross Classification;
[b]Following the definition of the included publication.
[c]Inclusion of patients based on other criterion: long gap and complication in primary repair (1), prenatal suspicion of EA (1).

**Table 2.** Identified studied parameters in EA research

| | | n = | % |
|---|---|---|---|
| **Baseline characteristics** | Sex | 178 | (85%) |
| | Gestational age or prematurity | 154 | (74%) |
| | Type of esophageal atresia | 154 | (74%) |
| | Cardiac malformation / Congenital heart disease | 149 | (71%) |
| | Birth weight | 144 | (69%) |
| | Age at surgery | 98 | (47%) |
| | Long Gap / Gap length | 97 | (46%) |
| | VACTERL[a]-association | 88 | (42%) |
| | Any other congenital malformation | 83 | (40%) |
| | Chromosomal / Genetic abnormalities | 82 | (39%) |
| | Renal/Genitourinary anomalies | 76 | (36%) |
| | Musculoskeletal / Limb anomalies | 74 | (35%) |
| | Anorectal malformation | 67 | (32%) |
| | Intestinal malformation | 57 | (27%) |
| | Age at time of study (survey, follow-up, intervention) | 56 | (27%) |
| | Weight at operation | 41 | (20%) |
| | Pulmonary / respiratory anomalies or conditions | 36 | (17%) |
| | Neurologic / Central nervous system anomalies | 31 | (15%) |
| | Fistula: yes/no | 28 | (13%) |
| | Previous esophageal surgery | 27 | (13%) |
| | Referred from other hospital | 25 | (12%) |
| | "Other" comorbidity (unspecified) | 23 | (11%) |
| | CHARGE[b] syndrome | 23 | (11%) |
| | Age at presentation / admission / diagnosis | 22 | (11%) |
| | Race / Ethnicity | 18 | (9%) |
| | Otolaryngeal anomalies / Auditory / Hearing issues | 13 | (6%) |
| | Laryngeal cleft / Laryngo-tracheo-oesophageal cleft | 12 | (6%) |
| | Spitz classification | 12 | (6%) |
| | Intra-uterine growth retardation/ Small-for- | 11 | (5%) |
| | Twin / Multiple birth | 11 | (5%) |
| **Treatment- and care process characteristics** | Type of repair (primary, secondary, interposition) | 125 | (60%) |
| | Age at surgery | 98 | (47%) |

| | | | |
|---|---|---|---|
| | Duration of follow-up | 82 | (39%) |
| | Gastrostomy at any point in time | 81 | (39%) |
| | Thoracotomy or thoracoscopy | 79 | (38%) |
| | Length of primary hospital stay | 78 | (37%) |
| | Number of dilatations | 74 | (35%) |
| | Duration of ventilation/intubation | 64 | (31%) |
| | Use of anti-acid medication (at any point in time) | 61 | (29%) |
| | Operation time | 37 | (18%) |
| | Aortopexy: yes or no | 33 | (16%) |
| | Cervical esophagostomy until surgery / at any point | 33 | (16%) |
| | Conversion thoracoscopy to thoracotomy | 29 | (14%) |
| | Time to start oral feeding (postoperatively) | 29 | (14%) |
| | Tracheostomy | 27 | (13%) |
| | Tension-free anastomosis / Concern regarding | 27 | (13%) |
| | Time on (neonatal) intensive care (days) | 27 | (13%) |
| | Prenatal diagnosis | 26 | (12%) |
| | Intra-operative chest tube | 23 | (11%) |
| | Bronchoscopy (intraoperative) | 22 | (11%) |
| | Transanastomotic tube | 21 | (10%) |
| | Polyhydramnios on antenatal ultrasound | 19 | (9%) |
| | Elongation procedure | 19 | (9%) |
| | Need for preoperative intubation/ventilation | 19 | (9%) |
| | Time to start tube feeding | 14 | (7%) |
| | Contrast study postoperative | 13 | (6%) |
| | Lung function (spirometry) in follow-up | 13 | (6%) |
| | Time between diagnosis and surgery | 13 | (6%) |
| | Time to full oral feeding | 13 | (6%) |
| | Thoracotomy: left or right approach | 12 | (6%) |
| | Use of inhalation medication | 12 | (6%) |
| | Echocardiography | 11 | (5%) |
| | Number of surgeries that patient underwent | 11 | (5%) |
| **Outcome** | Anastomotic stricture/stenosis | 150 | (72%) |
| | Anastomotic leakage | 143 | (69%) |
| | Mortality | 137 | (66%) |

| | | |
|---|---|---|
| Dilatations: yes or no | 128 | (61%) |
| Gastroesophageal reflux | 110 | (53%) |
| Anti-reflux surgery: yes or no | 88 | (42%) |
| Recurrent fistula | 84 | (40%) |
| Redo surgery (esophageal) | 79 | (38%) |
| Tracheomalacia | 63 | (30%) |
| Growth / Weight / Failure to thrive | 61 | (29%) |
| Oral feeding issues | 61 | (29%) |
| Respiratory complications / symptoms / chronic | 59 | (28%) |
| Pneumonia | 57 | (27%) |
| Dysphagia / Swallowing difficulties | 52 | (25%) |
| Sepsis | 43 | (21%) |
| Recurrent respiratory infections | 38 | (18%) |
| Pneumothorax | 36 | (17%) |
| Aortopexy: yes or no | 33 | (16%) |
| Vocal cord complications / Voice changing | 28 | (13%) |
| Gastro-intestinal symptoms | 23 | (11%) |
| Blood loss during primary surgery | 22 | (11%) |
| Wound complications | 20 | (10%) |
| Chylothorax | 19 | (9%) |
| Chest wall deformity | 19 | (9%) |
| Quality of Life | 16 | (8%) |
| Readmission | 16 | (8%) |
| Graft necrosis / Graft failure / Graft loss | 15 | (7%) |
| Complications: yes or no | 14 | (7%) |
| Motor-/Neurodevelopment | 13 | (6%) |
| Complications (intra-operative) | 11 | (5%) |
| Esophageal perforation after dilatation | 11 | (5%) |

[a]VACTERL: Vertebral defects, anal atresia, cardiac defects, tracheoesophageal fistula, renal anomalies and limb abnormalities. [b]CHARGE: Coloboma, heart defects, atresia choanae, growth retardation, genital abnormalities and ear abnormalities.

**Table 3.** Identified tools/instruments utilized and reported in one or more included publications

| | | n = | % |
|---|---|---|---|
| **Behavior** | (Modified) Vineland Social Maturity Scale | 2 | (<1%) |
| | Behavior Assessment System for Children (BASC II) | 1 | (<1%) |
| | Behavior Rating Inventory of Executive Function Preschool | 1 | (<1%) |
| | Child Behavior Checklist | 1 | (<1%) |
| **Birth** | Score for Neonatal Acute Physiology with Perinatal Extension (SNAPPE-II) | 1 | (<1%) |
| **Cognition** | Wechsler Intelligence Scale for Children (WISC) | 3 | (1%) |
| | Wechsler Preschool & Primary Scale of Intelligence (WPPSI) | 2 | (<1%) |
| | Ankara Developmental Screening Inventory | 1 | (<1%) |
| | Children's Memory Scale | 1 | (<1%) |
| | Developmental Neuropsychological Assessment (NEPSY) | 1 | (<1%) |
| | Revised Amsterdam Intelligence Test (RAKIT) | 1 | (<1%) |
| | Test of Everyday Attention for Children | 1 | (<1%) |
| | Wide Range Achievement Test (WRAT) | 1 | (<1%) |
| **Coping, transition and commitment to care** | Coping Strategy Checklist | 1 | (<1%) |
| | Fragebogen zur Messung der Patientenzufriedenheit (ZUF-8) | 1 | (<1%) |
| | Patient Activation Measure (PAM) | 1 | (<1%) |
| **Development** | Bayley Scales of Infant and Toddler Development (BSID) | 4 | (2%) |
| | Movement Assessment Battery for Children (M-ABC) | 3 | (1%) |
| | Ages and Stages Questionnaire | 1 | (<1%) |
| | Developmental Assessment Scale for Indian Infants | 1 | (<1%) |
| | Gross Motor Function Classification System (GMFCS) | 1 | (<1%) |
| | Kinderturntest plus / Deutscher Motorik Test | 1 | (<1%) |
| | Trivandrum Development Screening Chart (TDSC) | 1 | (<1%) |
| **Feeding** | Functional Oral Intake Score (FOIS) | 3 | (1%) |
| | Montreal Children's Hospital Feeding Scale (MCH-FS) | 2 | (<1%) |
| | International Dysphagia Diet Standardization Initiative (IDDSI) | 1 | (<1%) |
| | Karaduman Chewing Performance Scale (KCPS) | 1 | (<1%) |
| | Penetration and aspiration scale | 1 | (<1%) |
| | Turkish Feeding / Swallowing Impact Survey | 1 | (<1%) |

| | | | |
|---|---|---|---|
| **(Mental) health status and symptomatology** | German Health Survey for Children and Adolescents (KIGGS) | 2 | (<1%) |
| | Gastrointestinal Symptom Rating Scale (GSRS) | 1 | (<1%) |
| | Strength and Difficulties Questionnaire – 20 (SDQ-20) | 1 | (<1%) |
| | Risk Adjustment for Congenital Heart Surgery Score (Rachs) | 1 | (<1%) |
| **Quality of life** | Pediatric Quality of Life Inventory (PedsQL) | 8 | (4%) |
| | Gastrointestinal Quality of Life Index (GIQLI) | 4 | (2%) |
| | Self-developed questionnaire | 2 | (<1%) |
| | World Health Organization Quality of Life Questionnaire (WHOQOL-BREF) | 2 | (<1%) |
| | Child Health Questionnaire (CHF87-BREF) | 1 | (<1%) |
| | DISABKIDS Chronic Generic Measure - 47 | 1 | (<1%) |
| | KIDSCREEN-27 | 1 | (<1%) |
| | Short Form Survey (SF-36) | 1 | (<1%) |
| | TNO AZL Children's Quality of Life (TACQOL) | 1 | (<1%) |
| | TNO AZL Adult's Quality of Life (TAAQOL) | 1 | (<1%) |
| | WHO-5 / WHO-5 parental | 1 | (<1%) |
| **Trauma and stress** | Impact of Events Scale (IES-13) | 1 | (<1%) |
| | Parental stress scale | 1 | (<1%) |

Multiple instruments or tools may have been used in one publication.

**Identification of studies**

**Identification**

Records identified from*:
Embase (n = 2002)
Medline (Ovid) (n = 1517)
Cochrane Central (n = 58)

Records removed *before screening*:
Duplicate records removed (n = 1274)
Records removed before 2015 (n = 1485)

**Screening**

Records screened on title and abstract
(n = 818)

Records excluded
(n = 569)

Reports sought for retrieval
(n = 249)

Reports not retrieved
(n = 0)

Reports assessed for eligibility
(n = 249)

Reports excluded:
Not concerning main EA care process (n = 34)
Case series n<10 (n = 4)
Non-English language (n = 1)
Conference abstract (n = 1)

**Included**

Studies included in review
(n = 209)
Reports of included studies
(n = 209)

**Supplementary material of the manuscript:**

# Variability in the reporting of baseline characteristics, treatment and outcomes in esophageal atresia publications: a systematic review

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**Contents:**

**SUPPLEMENTARY 1: search strategy**

**Embase.com**

('esophagus atresia'/de OR (EA-TEF OR TOF-OA OR ((esophag* OR oesophag* OR tracheoesophag*) NEAR/3 (atresia* OR atretic*))):ab,ti,kw) AND ('morbidity'/exp OR 'mortality'/exp OR 'survival'/exp OR 'treatment outcome'/exp OR 'complication'/exp OR (morbidit* OR mortalit* OR surviv* OR outcome* OR complication*):ab,ti,kw) NOT ([conference abstract]/lim OR [editorial]/lim OR [letter]/lim) AND [English]/lim NOT ( 'review'/exp OR (review):ti) NOT ((animal/exp OR animal*:de OR nonhuman/de) NOT ('human'/exp))

**Medline (Ovid)**

(Esophageal Atresia/ OR (EA-TEF OR TOF-OA OR ((esophag* OR oesophag* OR tracheoesophag*) ADJ3 (atresia* OR atretic*))).ab,ti,kf.) AND (Morbidity/ OR exp Mortality/ OR mortality.fx. OR Survival/ OR exp Treatment Outcome/ OR (morbidit* OR mortalit* OR surviv* OR outcome* OR complication*).ab,ti,kf.) NOT (letter* OR news OR comment* OR editorial* OR congres* OR abstract* OR book* OR chapter* OR dissertation abstract*).pt. AND english.lg. NOT (exp Review/ OR (review).ti.) NOT (exp animals/ NOT humans/)

**Cochrane Central**

((EA NEXT TEF OR TOF NEXT OA OR ((esophag* OR oesophag* OR tracheoesophag*) NEAR/3 (atresia* OR atretic*))):ab,ti,kw) AND ((morbidit* OR mortalit* OR surviv* OR outcome* OR complication*):ab,ti,kw)

## SUPPLEMENTARY 2: included publications

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Askarpour S, et al. | Evaluation of risk factors affecting anastomotic leakage after repair of esophageal atresia | 2015 | Asia | 61 | Comparative | Retrospective | Cohort |
| Baird R, et al. | A pilot investigation of feeding problems in children with esophageal atresia | 2015 | North-America | 30 | Observational | Cross-sectional | Cohort |
| Bairdain S, et al. | Foker process for the correction of long gap esophageal atresia: Primary treatment versus secondary treatment after prior esophageal surgery | 2015 | North-America | 52 | Comparative | Retrospective | Cohort |
| Bevilacqua F, et al. | Factors affecting short-term neurodevelopmental outcome in children operated on for major congenital anomalies | 2015 | Europe | 41 | Observational | Prospective / Cross-Sectional | Cohort |
| Gallo G, et al. | A two-center comparative study of gastric pull-up and jejunal interposition for long gap esophageal atresia | 2015 | Europe | 24 | Comparative | Retrospective | Cohort |
| Huynh-Trudeau V, et al. | Dysphagia among adult patients who underwent surgery for esophageal atresia at birth | 2015 | North-America | 41 | Observational | Cross-sectional | Cohort |
| Kay-Rivest E, et al. | Evaluation of aortopexy in the management of severe tracheomalacia after esophageal atresia repair | 2015 | North-America | 132 | Observational | Retrospective | Cohort |
| Koivusalo AI, et al. | Revisional surgery for recurrent tracheoesophageal fistula and anastomotic complications after repair of esophageal atresia in 258 infants | 2015 | Europe | 258 | Observational | Retrospective | Cohort |
| Koziarkiewicz M, et al. | Long-term complications of congenital esophageal atresia–single institution experience | 2015 | Europe | 77 | Observational | Retrospective | Cohort |
| Mochizuki K, et al. | Impact of an external lengthening procedure on the outcome of long-gap esophageal atresia at our hospitals | 2015 | Asia | 16 | Comparative | Retrospective | Cohort |
| Okuyama H, et al. | Current practice and outcomes of thoracoscopic esophageal atresia and tracheoesophageal fistula repair: A multi-institutional analysis in Japan | 2015 | Asia | 58 | Observational | Retrospective | Cohort |
| Pini Prato A, et al. | A cross-sectional nationwide survey on esophageal atresia and tracheoesophageal fistula | 2015 | Europe | 146 | Observational | Retrospective | Cohort |
| Shah R, et al. | Predictive factors for complications in children with esophageal atresia and tracheoesophageal fistula | 2015 | Oceania | 100 | Observational | Retrospective | Cohort |
| Vukadin M, et al. | Analysis of Prognostic Factors and Mortality in Children with Esophageal Atresia | 2015 | Europe | 60 | Observational | Retrospective | Cohort |
| Woo S, et al. | Thoracoscopic versus open repair of tracheoesophageal fistulas and rates of vocal cord paresis | 2015 | North-America | 31 | Comparative | Retrospective | Cohort |
| Yalcin S, et al. | The evaluation of deglutition with videofluoroscopy after repair of esophageal atresia and/or tracheoesophageal fistula | 2015 | Eurasia | 32 | Observational | Cross-sectional | Cohort |
| Murase N, et al. | Prophylactic effect of H2 blocker for anastomotic stricture after esophageal atresia repair | 2015 | Asia | 27 | Comparative | Retrospective | Case-control |
| Yeung A, and Butterworth SA | A comparison of surgical outcomes between in-hours and after-hours tracheoesophageal fistula repairs | 2015 | North-America | 28 | Comparative | Retrospective | Cohort |
| Zhu H, et al. | Reoperation for anastomotic complications of esophageal atresia and tracheoesophageal fistula | 2015 | Asia | 21 | Observational | Retrospective | Cohort |
| Abouzeid AA, et al. | Posterior cologastric anastomosis: An effective antireflux mechanism in colonic replacement of the esophagus | 2016 | Africa | 16 | Observational | Retrospective | Cohort |
| Acher CW, et al. | Long-term outcomes of patients with tracheoesophageal fistula/esophageal atresia: Survey results from tracheoesophageal fistula/esophageal atresia online communities | 2016 | North-America | 445 | Observational | Cross-sectional | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Askarpour S, et al. | End-to-end versus end-to-side anastomosis in the treatment of esophageal atresia or trache-esophageal fistula | 2016 | Asia | 72 | Comparative | Retrospective | Cohort |
| Bakal U, et al. | Long-Term Prognosis of Patients with Esophageal Atresia and/or Tracheoesophageal Fistula | 2016 | Asia | 57 | Observational | Cross-sectional | Cohort |
| Bal HS, et al. | An assessment of quality of life of operated cases of esophageal atresia in the community | 2016 | Asia | 79 | Observational | Cross-sectional | Cohort |
| Bradshaw CJ, et al. | Accuracy of prenatal detection of tracheoesophageal fistula and oesophageal atresia | 2016 | Europe | 58 | Comparative | Retrospective | Cohort |
| Cartabuke RH, et al. | Long-term esophageal and respiratory outcomes in children with esophageal atresia and tracheoesophageal fistula | 2016 | North-America | 43 | Observational | Retrospective | Cohort |
| Choudhury SR, et al. | Pediatric esophageal substitution by gastric pull-up and gastric tube | 2016 | Asia | 22 | Observational | Retrospective | Cohort |
| Conforti A, et al. | Cervical repair of congenital tracheoesophageal fistula: Complications lurking! | 2016 | Europe | 18 | Comparative | Retrospective | Cohort |
| Deboer EM, et al. | Multidisciplinary care of children with repaired esophageal atresia and tracheoesophageal fistula | 2016 | North-America | 29 | Observational | Cross-sectional | Cohort |
| Dingemann C, et al. | Early complications after esophageal atresia repair: analysis of a German health insurance database covering a population of 8 million | 2016 | Europe | 75 | Observational | Retrospective | Cohort |
| Donoso F, et al. | Outcome and management in infants with esophageal atresia – A single centre observational study | 2016 | Europe | 129 | Comparative | Retrospective | Cohort |
| Hiradfar M, et al. | Thoracoscopic Esophageal Atresia with Tracheoesophageal Fistula Repair: The First Iranian Group Report, Passing the Learning Curve | 2016 | Asia | 24 | Observational | Retrospective | Cohort |
| Jönsson L, et al. | Treatment and Follow-Up of Patients with Long-Gap Esophageal Atresia: 15 Years' of Experience from the Western Region of Sweden | 2016 | Europe | 16 | Observational | Retrospective | Cohort |
| Malakounides G, et al. | Esophageal Atresia: Improved Outcome in High-Risk Groups Revisited | 2016 | Europe | 200 | Comparative | Retrospective | Cohort |
| Milickovic M, et al. | Gastric tube esophageal reconstruction in children with esophageal atresia and caustic stricture Study of clinical value based on 25 single-center. Centre experience | 2016 | Europe | 22 | Observational | Retrospective | Cohort |
| Okata Y, et al. | Evaluation of the intraoperative risk factors for esophageal anastomotic complications after primary repair of esophageal atresia with tracheoesophageal fistula | 2016 | Asia | 28 | Comparative | Retrospective | Cohort |
| Raitio A, et al. | Fluoroscopic balloon dilatation for anastomotic strictures in patients with esophageal atresia: A fifteen-year single centre UK experience | 2016 | Europe | 137 | Observational | Retrospective | Cohort |
| Rassiwala M, et al. | Determinants of gap length in esophageal atresia with tracheoesophageal fistula and the impact of gap length on outcome | 2016 | Asia | 69 | Comparative | Prospective | Cohort |
| Sayari AJ, et al. | Weekday vs. weekend repair of esophageal atresia and tracheoesophageal fistula | 2016 | North-America | 861 | Comparative | Retrospective | Cohort |
| Shah PS, et al. | Does continuous positive airway pressure for extubation in congenital tracheoesophageal fistula increase the risk of anastomotic leak? A retrospective cohort study | 2016 | Oceania | 51 | Comparative | Retrospective | Cohort |
| Walker K, et al. | Developmental outcomes at three years of age of infants with esophageal atresia | 2016 | Oceania | 24 | Comparative | Prospective | Case-control |
| Zani A, et al. | Preservation of native esophagus in infants with pure esophageal atresia has good long-term outcomes despite significant postoperative morbidity | 2016 | North-America | 12 | Observational | Retrospective | Cohort |
| Dingemann J, et al. | Transition of Patients with Esophageal Atresia to Adult Care: Results of a Transition-Specific Education Program | 2017 | Europe | 29 | Comparative | Cross-sectional | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Dittrich R, et al. | Pulmonary outcome of esophageal atresia patients and its potential causes in early childhood | 2017 | Europe | 27 | Observational | Cross-sectional | Cohort |
| Donoso F, and Lilja HE | Risk Factors for Anastomotic Strictures after Esophageal Atresia Repair: Prophylactic Proton Pump Inhibitors Do Not Reduce the Incidence of Strictures | 2017 | Europe | 128 | Comparative | Retrospective | Cohort |
| Elfiky MMA, et al. | Gastric tube esophagoplasty for pediatric esophageal replacement | 2017 | Africa | 27 | Observational | Retrospective | Cohort |
| Friedmacher F, et al. | Postoperative Complications and Functional Outcome after Esophageal Atresia Repair: Results from Longitudinal Single-Center Follow-Up | 2017 | Europe | 109 | Comparative | Retrospecive | Cohort |
| Gallo G, et al. | Respiratory function after esophageal replacement in children | 2017 | Europe | 15 | Comparative | Cross-sectional | Cohort |
| Gibreel W, et al. | Swallowing Dysfunction and Quality of Life in Adults with Surgically Corrected Esophageal Atresia/Tracheoesophageal Fistula as Infants | 2017 | North-America | 46 | Observational | Cross-sectional | Cohort |
| Harmsen WJ, et al. | Developmental problems in patients with oesophageal atresia: A longitudinal follow-up study | 2017 | Europe | 58 | Observational | Cross-sectional | Cohort |
| Hölscher AC, et al. | Quality of Life after Surgical Treatment for Esophageal Atresia: Long-Term Outcome of 154 Patients | 2017 | Europe | 154 | Observational | Cross-sectional | Cohort |
| Koivusalo AI, et al. | Long-term outcomes of oesophageal atresia without or with proximal tracheooesophageal fistula – Gross types A and B | 2017 | Europe | 68 | Observational | Retrospective | Cohort |
| Lal DR, et al. | Perioperative management and outcomes of esophageal atresia and tracheoesophageal fistula | 2017 | North-America | 396 | Comparative | Retrospective | Cohort |
| Li XW, et al. | A scoring system to predict mortality in infants with esophageal atresia | 2017 | Asia | 198 | Comparative | Retrospective | Cohort |
| Long AM, et al. | Oesophageal atresia with no distal tracheoesophageal fistula: Management and outcomes from a population-based cohort | 2017 | Europe | 21 | Observational | Prospective | Cohort |
| Menzies J, et al. | Prevalence of malnutrition and feeding difficulties in children with esophageal atresia | 2017 | Australia | 75 | Observational | Cross-sectional | Cohort |
| Miyano G, et al. | Changes in quality of life from infancy to school age after esophagoesophagostomy for tracheoesophageal fistula: thoracotomy versus thoracoscopy | 2017 | Asia | 37 | Comparative | Retrospective | Cohort |
| Narayanan SK, et al. | Is routine use of transanastomotic tube justified in the repair of esophageal atresia? | 2017 | Asia | 33 | Comparative | Retrospective | Cohort |
| Nomura A, et al. | Evaluation of developmental prognosis for esophageal atresia with tracheoesophageal fistula | 2017 | Asia | 47 | Comparative | Retrospective | Cohort |
| Okuyama H, et al. | Long-term morbidity in adolescents and young adults with surgically treated esophageal atresia | 2017 | Asia | 69 | Comparative | Retrospective | Cohort |
| Pedersen RN, et al. | Long-term pulmonary function in esophageal atresia—A case-control study | 2017 | Europe | 59 | Comparative | Cross-sectional | Case-control |
| Peters RT, et al. | Mortality and morbidity in oesophageal atresia | 2017 | Europe | 248 | Observational | Retrospective | Cohort |
| Porcaro F, et al. | Respiratory problems in children with esophageal atresia and tracheoesophageal fistula | 2017 | Europe | 105 | Observational | Retrospective | Cohort |
| Rattan KN, et al. | Clinical profile and short-term outcome of neonates with esophageal atresia and tracheoesophageal fistula at tertiary care center in a developing country: A 25-year experience | 2017 | Asia | 693 | Comparative | Retrospective | Cohort |
| Saiad MO | The Modified Posterior Thoracotomy for Esophageal Atresia | 2017 | Africa | 56 | Observational | Retrospective | Cohort |
| Schmidt A, et al. | Outcome of primary repair in extremely and very low-birth-weight infants with esophageal atresia/distal tracheoesophageal fistula | 2017 | Europe | 35 | Observational | Retrospective | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Shieh HF, et al. | Posterior Tracheopexy for Severe Tracheomalacia Associated with Esophageal Atresia (EA): Primary Treatment at the Time of Initial EA Repair versus Secondary Treatment | 2017 | North-America | 118 | Comparative | Retrospective | Cohort |
| Smithers CJ, et al. | Categorization and repair of recurrent and acquired tracheoesophageal fistulae occurring after esophageal atresia repair | 2017 | North-America | 66 | Observational | Retrospective | Cohort |
| Stenström P, et al. | Prolonged Use of Proton Pump Inhibitors as Stricture Prophylaxis in Infants with Reconstructed Esophageal Atresia | 2017 | Europe | 63 | Comparative | Prospective / Retrospective | Cohort |
| Stenström P, et al. | Dilations of anastomotic strictures over time after repair of esophageal atresia | 2017 | Europe | 131 | Comparative | Retrospective | Cohort |
| Tanaka Y, et al. | Comparison of outcomes of thoracoscopic primary repair of gross type C esophageal atresia performed by qualified and non-qualified surgeons | 2017 | Asia | 17 | Comparative | Retrospective | Cohort |
| Toussaint-Duyster LCC, et al. | Determinants of exercise capacity in school-aged esophageal atresia patients | 2017 | Europe | 63 | Observational | Cross-sectional | Cohort |
| Tröbs RB, et al. | Isolated tracheoesophageal fistula versus esophageal atresia – Early morbidity and short-term outcome. A single institution series | 2017 | Europe | 24 | Comparative | Retrospective | Cohort |
| Vaghela MM, et al. | Role of glycopyrrolate in healing of anastomotic dehiscence after primary repair of esophageal atresia in a low resource setting—A randomized controlled study | 2017 | Asia | 42 | Comparative | Prospective | Trial |
| Vergouwe FWT, et al. | Longitudinal evaluation of growth in oesophageal atresia patients up to 12 years | 2017 | Europe | 126 | Observational | Cross-sectional | Cohort |
| Wei S, et al. | Musculoskeletal deformities following neonatal thoracotomy: long-term follow-up of an esophageal atresia cohort | 2017 | North-America | 52 | Comparative | Retrospective | Cohort |
| Zani A, et al. | Long-term outcomes following H-type tracheoesophageal fistula repair in infants | 2017 | North-America | 16 | Observational | Retrospective | Cohort |
| Zeng Z, et al. | Outcomes of primary gastric transposition for long-gap esophageal atresia in neonates | 2017 | Asia | 14 | Observational | Retrospective | Cohort |
| Amin R, et al. | Long-term Quality of Life in Neonatal Surgical Disease | 2018 | North-America | 62 | Observational | Prospective | Cohort |
| Askarpour S, et al. | Muscle-sparing versus standard posterolateral thoracotomy in neonates with esophageal atresia | 2018 | Asia | 40 | Comparative | Prospective | Trial |
| Bastard F, et al. | Thoracic skeletal anomalies following surgical treatment of esophageal atresia. Lessons from a national cohort | 2018 | Europe | 322 | Observational | Cross-sectional | Cohort |
| Baxter KJ, et al. | Structural airway abnormalities contribute to dysphagia in children with esophageal atresia and tracheoesophageal fistula | 2018 | North-America | 145 | Comparative | Retrospective | Cohort |
| Bradshaw CJ, et al. | Outcomes of Esophageal Replacement: Gastric Pull-Up and Colonic Interposition Procedures | 2018 | Europe/Africa | 32 | Comparative | Retrospective | Cohort |
| Dai J, et al. | Experience of diagnosis and treatment of 31 H-type tracheoesophageal fistula in a single clinical center | 2018 | Asia | 31 | Observational | Retrospective | Cohort |
| Dylkowski D, et al. | Repair of congenital esophageal atresia with tracheoesophageal fistula repair in Ontario over the last 20 years: Volume and outcomes | 2018 | North-America | 465 | Observational | Retrospective | Cohort |
| Foster JD, et al. | Esophageal replacement by gastric transposition: A single surgeon's experience from a tertiary pediatric surgical center | 2018 | Europe | 17 | Observational | Retrospective | Cohort |
| Garabedian C, et al. | Management and outcome of neonates with a prenatal diagnosis of esophageal atresia type A: A population-based study | 2018 | Europe | 88 | Comparative | Retrospective | Cohort |
| Goodarzi M, et al. | Esophageal atresia: Recent five years' mortality and morbidity | 2018 | Asia | 43 | Comparative | Retrospective | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Kamran A, et al. | Slide Esophagoplasty vs End-to-End Anastomosis for Recalcitrant Esophageal Stricture after Esophageal Atresia Repair | 2018 | North-America | 50 | Comparative | Retrospective | Cohort |
| Koivusalo A, et al. | Location of TEF at the carina as an indicator of long-gap C-Type esophageal atresia | 2018 | Europe | 247 | Comparative | Retrospective | Cohort |
| Konig TT, and Muensterer OJ | Physical Fitness and Locomotor Skills in Children With Esophageal Atresia-A Case Control Pilot Study | 2018 | Europe | 12 | Observational | Cross-sectional | Cohort |
| Kovesi T, et al. | Vocal cord paralysis appears to be an acquired lesion in children with repaired esophageal atresia/tracheoesophageal fistula | 2018 | Europe | 64 | Observational | Retrospective | Cohort |
| Lal DR, et al. | Challenging surgical dogma in the management of proximal esophageal atresia with distal tracheoesophageal fistula: Outcomes from the Midwest Pediatric Surgery Consortium | 2018 | North-America | 292 | Comparative | Retrospective | Cohort |
| Leibovitch L, et al. | Infants born with esophageal atresia with or without tracheo-esophageal fistula: Short-and long-term outcomes | 2018 | Asia | 46 | Comparative | Cross-sectional | Cohort |
| Lin CH, et al. | Thoracoscopic repair of esophageal atresia: Comparison with open approach | 2018 | Asia | 21 | Comparative | Retrospective | Cohort |
| Macchini F, et al. | Classification of Esophageal Strictures following Esophageal Atresia Repair | 2018 | Europe | 40 | Observational | Retrospective | Cohort |
| Masuya R, et al. | Predictive factors affecting the prognosis and late complications of 73 consecutive cases of esophageal atresia at 2 centers | 2018 | Asia | 73 | Comparative | Retrospective | Cohort |
| Mawlana W, et al. | Neurodevelopmental outcomes of infants with esophageal atresia and tracheoesophageal fistula | 2018 | Africa | 253 | Observational | Retrospective | Cohort |
| Serel Arslan S, et al. | Chewing Function in Children with Repaired Esophageal Atresia-Tracheoesophageal Fistula | 2018 | Eurasia | 30 | Observational | Cross-sectional | Cohort |
| Stenström P, et al. | Congenital heart disease and its impact on the development of anastomotic strictures after reconstruction of esophageal atresia | 2018 | Europe | 96 | Comparative | Retrospective | Cohort |
| Svoboda E, et al. | A patient led, international study of long term outcomes of esophageal atresia: EAT 1 | 2018 | World | 928 | Observational | Cross-sectional | Cohort |
| Vergouwe FWT, et al. | High Prevalence of Barrett's Esophagus and Esophageal Squamous Cell Carcinoma After Repair of Esophageal Atresia | 2018 | Europe | 148 | Observational | Prospective | Cohort |
| Yamoto M, et al. | New prognostic classification and managements in infants with esophageal atresia101 | 2018 | Asia | 65 | Observational | Retrospective | Cohort |
| Youn JK, et al. | Prospective evaluation of clinical outcomes and quality of life after gastric tube interposition as esophageal reconstruction in children | 2018 | Asia | 25 | Observational | Retrospective / Cross-sectional | Case-control |
| Zhu H, et al. | Diagnosis and management of post-operative complications in esophageal atresia patients in China: A retrospective analysis from a single institution | 2018 | Asia | 172 | Observational | Retrospective | Cohort |
| Ammar S, et al. | Management of esophageal atresia and early predictive factors of mortality and morbidity in a developing country | 2019 | Africa | 42 | Observational | Retrospective | Cohort |
| Boumas N, et al. | Surgical treatment of esophageal atresia: our experience after 24 years | 2019 | Europe | 76 | Observational | Retrospective | Cohort |
| Chiarenza SF, et al. | The Use of Endoclips in Thoracoscopic Correction of Esophageal Atresia: Advantages or Complications? | 2019 | Europe | 32 | Observational | Retrospective | Cohort |
| Ferrand A, et al. | Postoperative noninvasive ventilation and complications in esophageal atresia–tracheoesophageal fistula | 2019 | North-America | 91 | Observational | Retrospective | Cohort |
| Firriolo JM, et al. | Supercharged Jejunal Interposition: A Reliable Esophageal Replacement in Pediatric Patients | 2019 | North-America | 17 | Observational | Retrospective | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Flieder S, et al. | Generic Health-Related Quality of Life after Repair of Esophageal Atresia and Its Determinants within a German-Swedish Cohort | 2019 | Europe | 192 | Comparative | Cross-sectional | Cohort |
| François B, et al. | Predictors of the Performance of Early Antireflux Surgery in Esophageal Atresia | 2019 | Europe | 682 | Comparative | Prospective | Cohort |
| Fung SW, et al. | Vocal cord dysfunction following esophageal atresia and tracheoesophageal fistula (EA/TEF) repair | 2019 | North-America | 197 | Comparative | Retrospective | Cohort |
| Grunder FR, et al. | Should Proton Pump Inhibitors be Systematically Prescribed in Patients with Esophageal Atresia after Surgical Repair? | 2019 | North-America | 73 | Comparative | Prospective | Cohort |
| Ishimaru T, et al. | Impact of congenital heart disease on outcomes after primary repair of esophageal atresia: a retrospective observational study using a nationwide database in Japan | 2019 | Asia | 431 | Comparative | Retrospective | Cohort |
| Jönsson L, et al. | Long-Term Effectiveness of Antireflux Surgery in Esophageal Atresia Patients | 2019 | Europe | 99 | Comparative | Retrospective | Cohort |
| Kumari V, et al. | Developmental Status of Children Operated for Esophageal Atresia with or without Tracheoesophageal Fistula Along with Maternal Stress, Their Quality of life, and Coping Abilities at AIIMS, New Delhi | 2019 | Asia | 51 | Observational | Cross-sectional | Cohort |
| Lal DR, et al. | Infants with esophageal atresia and right aortic arch: Characteristics and outcomes from the Midwest Pediatric Surgery Consortium | 2019 | North-America | 396 | Comparative | Retrospective | Cohort |
| Lawrence, A E et al | Relationships between hospital and surgeon operative volumes and outcomes of esophageal atresia/tracheoesophageal fistula repair | 2019 | North-America | 3085 | Comparative | Retrospective | Cohort |
| Nurminen P, et al. | Pneumonia after Repair of Esophageal Atresia-Incidence and Main Risk Factors | 2019 | Europe | 104 | Observational | Retrospective | Cohort |
| Petit LM, et al. | Prevalence and Predictive Factors of Histopathological Complications in Children with Esophageal Atresia | 2019 | North-America | 85 | Observational | Prospective | Cohort |
| Rayyan M, et al. | Neonatal factors predictive for respiratory and gastro-intestinal morbidity after esophageal atresia repair | 2019 | Europe | 93 | Observational | Retrospective | Cohort |
| Shirota C, et al. | Therapeutic strategy for thoracoscopic repair of esophageal atresia and its outcome | 2019 | Asia | 39 | Observational | Retrospective | Cohort |
| Slater BJ, et al. | Use of magnets as a minimally invasive approach for anastomosis in esophageal atresia: Long-term outcomes | 2019 | North-America | 13 | Observational | Retrospective | Cohort |
| Sømme S, et al. | Neonatal surgery in low- vs. high-volume institutions: a KID inpatient database outcomes and cost study after repair of congenital diaphragmatic hernia, esophageal atresia, and gastroschisis | 2019 | North-America | 1280 | Comparative | Retrospective | Cohort |
| Stadil T, et al. | Surgical repair of long-gap esophageal atresia: A retrospective study comparing the management of long-gap esophageal atresia in the Nordic countries | 2019 | Europe | 71 | Comparative | Retrospective | Cohort |
| Thompson A, et al. | Not all neonates with oesophageal atresia and tracheoesophageal fistula are a surgical emergency | 2019 | Europe | 64 | Observational | Retrospective | Cohort |
| Vergouwe FWT, et al. | Risk factors for refractory anastomotic strictures after oesophageal atresia repair: A multicentre study | 2019 | Europe | 454 | Observational | Retrospective | Cohort |
| Askarpour S, et al. | INCIDENCE OF MALNUTRITION, ESOPHAGEAL STENOSIS AND RESPIRATORY COMPLICATIONS AMONG CHILDREN WITH REPAIRED ESOPHAGEAL ATRESIA | 2020 | Asia | 43 | Observational | Retrospective | Cohort |
| Badran EF, et al. | Esophageal atresia: Associated anomalies, mortality, and morbidity in Jordan | 2020 | Asia | 55 | Observational | Retrospective | Cohort |
| Bevilacqua F, et al. | Fixed the gap, solved the problem? Eating skills in esophageal atresia patients at 3 years | 2020 | Europe | 54 | Observational | Cross-sectional | Cohort |
| Blanco AJ, et al. | Comorbidities and course of lung function in patients with congenital esophageal atresia | 2020 | Europe | 97 | Observational | Retrospective | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Bludevich BM, et al. | 30-Day Outcomes Following Esophageal Replacement in Children: A National Surgical Quality Improvement Project Pediatric Analysis | 2020 | North-America | 78 | Comparative | Retrospective | Cohort |
| Campos J, et al. | The burden of esophageal dilatations following repair of esophageal atresia | 2020 | Oceania | 258 | Observational | Retrospective | Cohort |
| Chou CS, et al. | Fiberoptic bronchoesophagoscopy-assisted evaluation and prognostic factor analysis in children with congenital esophageal atresia and tracheoesophageal fistula | 2020 | Asia | 33 | Observational | Retrospective | Cohort |
| Cui X, et al. | Clinical Analysis of Azygos Vein Preservation Under Thoracoscope in the Operation of Type III Esophageal Atresia | 2020 | Asia | 70 | Comparative | Retrospective | Cohort |
| Cui X, et al. | The value of thoracic lavage in the treatment of anastomotic leakage after surgery for type III esophageal atresia | 2020 | Asia | 92 | Comparative | Retrospective | Cohort |
| Dey S, et al. | First-Year follow-up of Newborns Operated for Esophageal Atresia in a Developing Country: Just Operating is not Enough! | 2020 | Asia | 70 | Observational | Retrospective | Cohort |
| Dingemann C, et al. | Low gestational age is associated with less anastomotic complications after open primary repair of esophageal atresia with tracheoesophageal fistula | 2020 | Europe | 75 | Observational | Retrospective | Cohort |
| Donoso F, et al. | Pulmonary function in children and adolescents after esophageal atresia repair | 2020 | Europe | 46 | Observational | Retrospective | Cohort |
| Elbarbary MM, et al. | Outcome of thoracoscopic repair of type-C esophageal Atresia: A single-center experience from North Africa | 2020 | Africa | 46 | Observational | Prospective | Cohort |
| Elhattab A, et al. | Thoracoscopy Versus Thoracotomy in the Repair of Esophageal Atresia with Distal Tracheoesophageal Fistula | 2020 | Europe | 187 | Comparative | Retrospective | Cohort |
| Fernandes E, et al. | Is thoracoscopic esophageal atresia repair safe in the presence of cardiac anomalies? | 2020 | Oceania | 49 | Comparative | Retrospective | Cohort |
| Garcia HJ, et al. | Experience of Minimally Invasive Surgery in Neonates with Congenital Malformations in a Tertiary Care Pediatric Hospital | 2020 | South America | 22 | Observational | Prospective | Cohort |
| Hannon E, et al. | Outcomes in adulthood of gastric transposition for complex and long gap esophageal atresia | 2020 | Europe | 64 | Comparative | Cross-sectional | Cohort |
| Jones CE, et al. | Association Between Administration of Antacid Medication and Anastomotic Stricture Formation After Repair of Esophageal Atresia | 2020 | Europe | 114 | Comparative | Retrospective | Cohort |
| Jones CE, et al. | Repair of oesophageal atresia by consultants and supervised trainees results in similar outcomes | 2020 | Europe | 120 | Comparative | Retrospective | Cohort |
| Kim W, et al. | The learning curve for thoracoscopic repair of esophageal atresia with distal tracheoesophageal fistula: A cumulative sum analysis | 2020 | Asia | 50 | Observational | Retrospective | Cohort |
| Koivusalo A, et al. | Indications, Surgical Complications, and Long-Term Outcomes in Pediatric Esophageal Reconstructions with Pedicled Jejunal Interposition Graft | 2020 | Europe | 14 | Observational | Retrospective | Cohort |
| Kulshrestha S, et al. | Conservative Management of Major Anastomotic Leaks Occurring after Primary Repair in Esophageal Atresia with Fistula: Role of EYestrapleural Approach | 2020 | Asia | 203 | Observational | Retrospective | Cohort |
| Lieber J, et al. | Functional outcome after laparoscopic assisted gastric transposition including pyloric dilatation in long-gap esophageal atresia | 2020 | Europe | 14 | Observational | Retrospective | Cohort |
| Mikkelsen A, et al. | Traumatic stress, mental health and quality of life in adolescents with esophageal atresia | 2020 | Europe | 68 | Comparative | Cross-sectional | Case-control |
| Nguyen MVL, et al. | The value of prophylactic chest tubes in tracheoesophageal fistula repair | 2020 | North-America | 109 | Comparative | Retrospective | Case-control |
| Pelizzo G, et al. | Esophageal Atresia: Nutritional Status and Energy Metabolism to MaYesimize Growth Outcome | 2020 | Europe | 21 | Observational | Cross-sectional | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Pruitt LCC, et al. | Impact of consolidation of cases on post-operative outcomes for indexes pediatric surgery cases | 2020 | North-America | 673 | Comparative | Retrospective | Cohort |
| Puliński M, et al. | Congenital esophageal atresia treated with thoracoscopic approach – Results of surgical treatment | 2020 | Europe | 28 | Observational | Retrospective | Cohort |
| Quiroz HJ, et al. | Nationwide analysis of mortality and hospital readmissions in esophageal atresia | 2020 | North-America | 3157 | Observational | Retrospective | Cohort |
| Ritz LA, et al. | Outcome of Patients With Esophageal Atresia and Very Low Birth Weight (≤ 1,500 g) | 2020 | Europe | 48 | Comparative | Cross-sectional | Cohort |
| Rozeik AE, et al. | Thoracoscopic versus conventional open repair of tracheoesophageal fistula in neonates: A short-term comparative study | 2020 | Africa | 30 | Comparative | Prospective | Trial |
| Serel Arslan S, et al. | Assessment of the Concerns of Caregivers of Children with Repaired Esophageal Atresia-Tracheoesophageal Fistula Related to Feeding-Swallowing Difficulties | 2020 | Eurasia | 64 | Observational | Cross-sectional | Cohort |
| Soyer T, et al. | The effect of azygos vein preservation on postoperative complications after esophageal atresia repair: Results from the Turkish Esophageal Atresia Registry | 2020 | Eurasia | 315 | Comparative | Retrospective | Cohort |
| Tan Tanny SP, et al. | Predictors of Mortality after Primary Discharge from Hospital in Patients with Esophageal Atresia | 2020 | Oceania | 650 | Observational | Prospective | Cohort |
| Zhang J, et al. | Clinical analysis of surgery for type III esophageal atresia via thoracoscopy: a study of a Chinese single-center eYesperience | 2020 | Asia | 92 | Comparative | Retrospective | Cohort |
| Acharya SK, et al. | Gastric pull-up by the retrosternal route for esophageal replacement: Feasibility in a limited-resource scenario | 2021 | Asia | 18 | Observational | Retrospective | Cohort |
| Aworanti OM, et al. | Extubation strategies after esophageal atresia repair | 2021 | Europe | 46 | Comparative | Retrospective | Cohort |
| Ax SÖ, et al. | Parent-reported feeding difficulties among children born with esophageal atresia: Prevalence and early risk factors | 2021 | Europe | 114 | Observational | Cross-sectional | Cohort |
| Baghdadi O, et al. | Initial Esophageal Anastomosis Diameter Predicts Treatment Outcomes in Esophageal Atresia Patients With a High Risk for Stricture Development | 2021 | North-America | 121 | Observational | Retrospective | Cohort |
| Bence CM, et al. | Clinical outcomes following implementation of a management bundle for esophageal atresia with distal tracheoesophageal fistula | 2021 | North-america | 170 | Comparative | Retrospective | Cohort |
| Besendörfer M, et al. | Association of clinical factors with postoperative complications of esophageal atresia | 2021 | Europe | 43 | Observational | Retrospective | Cohort |
| Burnett AC, et al. | Cognitive, academic, and behavioral functioning in school-aged children born with esophageal atresia | 2021 | Oceania | 98 | Observational | Cross-sectional | Cohort |
| Chiang CM, et al. | Risk factors and management for anastomotic stricture after surgical reconstruction of esophageal atresia | 2021 | Asia | 40 | Observational | Retrospective | Cohort |
| Di Natale A, et al. | Long-Term Outcomes and Health-Related Quality of Life in a Swiss Patient Group with Esophageal Atresia | 2021 | Europe | 30 | Observational | Cross-sectional | Cohort |
| Etchill EW, et al. | Association of operative approach with outcomes in neonates with esophageal atresia and tracheoesophageal fistula | 2021 | North-America | 855 | Comparative | Retrospective | Cohort |
| Flatrès C, et al. | Prevalence of acid gastroesophageal reflux disease in infants with esophageal atresia/tracheoesophageal fistula | 2021 | Europe | 70 | Observational | Prospective | Cohort |
| Folaranmi SE, et al. | Influence of birth weight on primary surgical management of newborns with esophageal atresia | 2021 | Europe | 198 | Comparative | Retrospective | Cohort |
| Francesca B, et al. | Neurodevelopmental outcome in infants with esophageal atresia: risk factors in the first year of life | 2021 | Europe | 82 | Observational | Prospective | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Gallo G, et al. | Quality of life after esophageal replacement in children | 2021 | Europe | 24 | Comparative | Cross-sectional | Cohort |
| Harrington AW, et al. | Nutrition delivery and growth outcomes in infants with long-gap esophageal atresia who undergo the Foker process | 2021 | North-America | 45 | Observational | Retrospective | Cohort |
| Hew NLC, et al. | Predictors of poor outcomes in children with tracheoesophageal fistula/oesophageal atresia: An Australian experience | 2021 | Oceania | 103 | Observational | Retrospecive | Cohort |
| Huang JX, et al. | Risk factors for anastomotic complications after one-stage anastomosis for oesophageal atresia | 2021 | Asia | 107 | Observational | Retrospective | Cohort |
| Jo Svetanoff W, et al. | The left-sided repair: An alternative approach for difficult esophageal atresia repair | 2021 | North-America | 47 | Comparative | Retrospective | Cohort |
| Lejeune S, et al. | Esophageal atresia and respiratory morbidity | 2021 | Europe | 1287 | Observational | Prospective | Cohort |
| Lu YH, et al. | Risk factors for digestive morbidities after esophageal atresia repair | 2021 | Asia | 72 | Observational | Retrospective | Cohort |
| Maan M, et al. | Growth and Development Assessment of Children (1-5 Years) Operated for Tracheoesophageal Fistula/Esophageal Atresia: A Case Control study | 2021 | Asia | 40 | Comparative | Retrospective | Case-control |
| O'Connor E, and Jaffray B | Surgeon-Level Variation in Outcome following Esophageal Atresia Repair Is Not Explained by Volume | 2021 | Europe | 190 | Observational | Retrospective | Cohort |
| Oliver DH, et al. | Favorable Outcome of Electively Delayed Elongation Procedure in Long-Gap Esophageal Atresia | 2021 | Europe | 13 | Observational | Retrospective | Cohort |
| Ozsin-Ozler C, et al. | Oral Health Status among Children with Repaired Esophageal Atresia | 2021 | Eurasia | 35 | Observational | Cross-sectional | Cohort |
| Oztan MO, et al. | Outcome of Very Low and Low Birth Weight Infants with Esophageal Atresia: Results of the Turkish Esophageal Atresia Registry | 2021 | Eurasia | 389 | Comparative | Prospective | Cohort |
| Patterson K, et al. | Quantifying Upper Aerodigestive Sequelae in Esophageal Atresia/Tracheoesophageal Fistula Neonates | 2021 | North-America | 2509 | Observational | Retrospective | Cohort |
| Pham A, et al. | Feeding disorders in children with oesophageal atresia: A cross-sectional study | 2021 | Europe | 145 | Observational | Prospective / Cross-Sectional | Cohort |
| Saiad MO | A wave-like anastomosis, a new technique of anastomosis to prevent stricture after oesophageal atresia repair | 2021 | Africa | 49 | Comparative | Retrospective | Cohort |
| Samraj P, et al. | Primary anastomosis in difficult cases of type “C” esophageal atresia: The atraumatic microvascular clamp technique of minimal tension with good outcome | 2021 | Asia | 32 | Observational | Prospective | Cohort |
| Schmedding A, et al. | Outcome of esophageal atresia in Germany | 2021 | Europe | 287 | Observational | Retrospective | Cohort |
| Sfeir R, et al. | Risk Factors of Early Mortality and Morbidity in Esophageal Atresia with Distal Tracheoesophageal Fistula: A Population-Based Cohort Study | 2021 | Europe | 1008 | Observational | Prospective | Cohort |
| Sinopidis X, et al. | Oesophageal atresia without major cardiovascular anomalies: Is management justified at a district paediatric surgical institution? | 2021 | Europe | 33 | Comparative | Retrospective | Cohort |
| Son J, et al. | Thoracoscopic repair of esophageal atresia with distal tracheoesophageal fistula: is it a safe procedure in infants weighing less than 2000 g? | 2021 | Asia | 41 | Comparative | Retrospective | Cohort |
| Sreeram, II, et al. | Patient-Reported Outcome Measures and Clinical Outcomes in Children with Foregut Anomalies | 2021 | Europe | 93 | Observational | Cross-sectional | Cohort |
| Svetanoff WJ, et al. | Contemporary outcomes of the Foker process and evolution of treatment algorithms for long-gap Esophageal Atresia | 2021 | North-America | 102 | Comparative | Retrospective | Cohort |

| Author | Title | Year | Continent | n = | Study design | | |
|---|---|---|---|---|---|---|---|
| Taghavi K, et al. | H-type congenital tracheoesophageal fistula: Insights from 70 years of The Royal Children's Hospital eYesperience | 2021 | Oceania | 56 | Observational | Prospective | Cohort |
| Tannuri ACA, et al. | Esophageal substitution or esophageal elongation procedures in patients with complicated esophageal atresia? Results of a comparative study | 2021 | South America | 276 | Observational | Cross-sectional | Cohort |
| Thakkar H, et al. | Thoracoscopic oesophageal atresia/tracheo-oesophageal fistula (OA/TOF) repair is associated with a higher stricture rate: a single institution's experience | 2021 | Europe | 95 | Comparative | Retrospective | Cohort |
| Thompson K, et al. | Evolution, lessons learned, and contemporary outcomes of esophageal replacement with jejunum for children | 2021 | North-America | 48 | Comparative | Retrospective | Cohort |
| Toczewski K, et al. | Thoracoscopic repair of congenital isolated H-type tracheoesophageal fistula | 2021 | Europe | 12 | Observational | Retrospective | Cohort |
| Tuğcu GD, et al. | Evaluation of pulmonary complications and affecting factors in children for repaired esophageal atresia and tracheoesophageal fistula | 2021 | Eurasia | 71 | Observational | Retrospective / Cross-sectional | Cohort |
| van Hoorn CE, et al. | Primary repair of esophageal atresia is followed by multiple diagnostic and surgical procedures | 2021 | Europe | 102 | Comparative | Retrospective | Cohort |
| van Hoorn CE, et al. | Associations of perioperative characteristics with motor function in preschool children born with esophageal atresia | 2021 | Europe | 53 | Observational | Retrospective / Cross-sectional | Cohort |
| van Tuyll van Serooskerken ES, et al. | Childhood outcome after correction of long-gap esophageal atresia by thoracoscopic external traction technique | 2021 | Europe | 11 | Observational | Retrospective | Cohort |
| van Tuyll van Serooskerken ES, et al. | Thoracoscopic Repair of Esophageal Atresia | 2021 | Europe | 11 | Comparative | Retrospective | Cohort |
| Yasuda JL, et al. | Prophylactic negative vacuum therapy of high-risk esophageal anastomoses in pediatric patients | 2021 | North-America | 14 | Comparative | Retrospective | Case-control |

## SUPPLEMENTARY 3: Extracted baseline characteristics

*As several parameters could arguably be included in more than one category, categorization followed agreement between the first two authors. We further arranged the parameters by topic, such as comorbidities, primary treatment, specific complications and long-term outcome, to facilitate the comparison of variation in studied parameters within similar subjects. Underlined items were studied in more than 5% of included publications.

### Patient characteristics

| | n = | % |
|---|---|---|
| Age at time of filling in questionnaire / intervention / time of follow up | 56 | 27% |
| Age at presentation / admission / diagnosis | 22 | 11% |
| Age at referral from other hospital | 1 | <1% |
| Age at study completion | 1 | <1% |
| Mortality prediction (Spitz classificiation) | 12 | 6% |
| Mortality prediction (Waterston classification) | 4 | 2% |
| Mortality prediction (Montreal classification) | 1 | <1% |
| Weight at birth | 144 | 69% |
| Birth height / length | 6 | 3% |
| Mode of delivery: C-section versus Vaginal | 6 | 3% |
| Birth order \|\| First pregnancy | 3 | 1% |
| Inborn versus Outborn | 2 | 1% |
| Mode of conception: IVF or spontaneous | 2 | 1% |
| Incidence conception (when) | 1 | <1% |
| Season of birth | 1 | <1% |
| Family history of EA | 3 | 1% |
| Family history of congenital anomalies | 1 | <1% |
| Family history of horse shoe kidney | 1 | <1% |
| Aortic arch: side | 5 | 2% |
| Alcohol consumption | 1 | <1% |
| Tobacco smoking | 1 | <1% |
| Weight at operation | 41 | 20% |
| Weight for gestational age | 4 | 2% |
| Weight-for-age at admission | 2 | 1% |
| Head circumference | 1 | <1% |
| SD from weight at gestational age | 1 | <1% |
| Weight-for-age at operation | 1 | <1% |
| Gender | 178 | 85% |
| Gestational age or prematurity | 154 | 74% |
| Previous esophageal repair/surgery | 27 | 13% |
| Referred from other hospital | 25 | 12% |
| Race/Ethnicity | 18 | 9% |
| Intra-uterine growth / Small for gestational age | 11 | 5% |
| Twin / Multiple birth | 11 | 5% |
| Education | 3 | 1% |
| Occupation | 1 | <1% |
| Originating country | 1 | <1% |
| Year of admission | 1 | <1% |

### Disease characteristics

| | n = | % |
|---|---|---|
| Presenting symptoms | 10 | 5% |
| Site of fistula / TEF | 5 | 2% |
| TEF diameter (fistula) | 1 | <1% |
| Type of EA | 154 | 74% |
| Long Gap / Gap length | 97 | 46% |
| Fistula: yes/no | 28 | 13% |
| Clinical EA-severity | 2 | 1% |

## Comorbidities

| | n = | % |
|---|---|---|
| Abdominal wall | 2 | 1% |
| Inguinal Hernia | 1 | <1% |
| Omphalocele | 1 | <1% |
| Pulmonary/respiratory conditions | 36 | 17% |
| IRDS / Neonatal Respiratory Distress Syndrome | 8 | 4% |
| Anatomical variations on fiberbronchoscopy | 1 | <1% |
| Lung hypoplasia (preoperative) | 1 | <1% |
| Lung maturation | 1 | <1% |
| Structural Airway Anomaly | 1 | <1% |
| Three main bronchi | 1 | <1% |
| Tracheal anomaly | 1 | <1% |
| ARM | 67 | 32% |
| Chromosomal/Genetic abnormalities | 82 | 39% |
| Apgar Score at birth | 4 | 2% |
| Asphyxia at birth | 2 | 1% |
| Recussitation at birth | 1 | <1% |
| Score for Neonatal Acute Physiology with Perinatal Extension-II (SNAPPE II ) | 1 | <1% |
| Anomalies of the head or neck | 10 | 5% |
| Anomalies of the palatum | 6 | 3% |
| Choanal atresia | 6 | 3% |
| Cleft lip | 1 | <1% |
| Craniosynostosis | 1 | <1% |
| Oropharyngeal abnormalities | 1 | <1% |
| CDH | 4 | 2% |
| Right-sided diaphragmatic relaxation | 1 | <1% |
| Eye anomaly / coloboma | 2 | 1% |
| Blind | 1 | <1% |
| Intestinal malformation | 57 | 27% |
| Congenital esophageal stenosis | 6 | 3% |
| Necrotizing enterocolitis | 6 | 3% |
| At least one associated anomaly | 83 | 4<1 % |
| "Other" comorbidity (unspecified) | 23 | 11% |

| | n = | % |
|---|---|---|
| Number of associated anomalies | 9 | 4% |
| Major associated anomaly | 4 | 2% |
| Minor associated anomaly | 2 | 1% |
| No comorbidities | 2 | 1% |
| Associated malformation affecting growth | 1 | <1% |
| Multiple anomalies | 1 | <1% |
| Cardiac malformation / Congenital heart disease | 149 | 71% |
| Great vessel anomalies / Vascular | 9 | 4% |
| Cardiac severity score (based on diagnosis, clinical) | 1 | <1% |
| Severity of associated cardiac anomalies (Rachs score) | 1 | <1% |
| Hematologic disorder | 2 | 1% |
| Laryngeal cleft / Laryngo-tracheo-oesophageal cleft | 12 | 6% |
| Laryngeal atresia | 1 | <1% |
| Laryngeal stenosis | 1 | <1% |
| Musculoskeletal or limb anomalies | 74 | 35% |
| Polydactyly | 1 | <1% |
| Neurologic or central or CNS anomalies | 31 | 15% |
| Atopy | 1 | <1% |
| Spina bifida | 1 | <1% |
| Tethered cord | 1 | <1% |
| Renal/Genitourinary anomalies | 76 | 36% |
| Otolaryngeal anomalies / Auditory / Hearing issues | 13 | 6% |
| VACTERL | 88 | 42% |
| CHARGE | 23 | 11% |
| Poland syndrome | 1 | <1% |
| VATER | 1 | <1% |
| Hypothyreoidism | 1 | <1% |
| Subglottic stenosis (preoperative) | 4 | 2% |
| ASA class | 3 | 1% |

## Paternal characteristics

| | n = | % |
|---|---|---|
| Maternal age | 8 | 4% |
| Insurance status | 6 | 3% |
| Socioeconomic status | 6 | 3% |
| Income | 3 | 1% |
| Paternal age | 2 | 1% |
| Residential area | 2 | 1% |
| Sociodemographic factors | 2 | 1% |
| (Number of) siblings | 1 | <1% |
| Age of caregivers (at time of filling in questionnaire / intervention) | 1 | <1% |
| Consanguinity | 1 | <1% |
| Maternal education / Parental education | 1 | <1% |
| Maternal problems | 1 | <1% |
| Maternal profession | 1 | <1% |
| Migration background | 1 | <1% |
| Number of family members maternal side | 1 | <1% |
| Parental age | 1 | <1% |
| Parental employment status | 1 | <1% |
| Parental gender | 1 | <1% |
| Parental health status | 1 | <1% |
| Parental partnership | 1 | <1% |
| Primary language spoken at home | 1 | <1% |
| Primary payer (government, private, other) | 1 | <1% |

## SUPPLEMENTARY 4: Extracted treatment- and care-process characteristics

*As several parameters could arguably be included in more than one category, categorization followed agreement between the first two authors. We further arranged the parameters by topic, such as comorbidities, primary treatment, specific complications and long-term outcome, to facilitate the comparison of variation in studied parameters within similar subjects. Underlined items were studied in more than 5% of included publications.

### Hospital structure

| | n = | % |
|---|---|---|
| Born in tertiary center | 1 | <1% |
| Hospital of delivery: pediatrician available? | 1 | <1% |
| Transfer after birth | 1 | <1% |
| Multidiscipline specialist team for follow-up | 4 | 2% |
| Lost to follow-up | 1 | <1% |
| Number of visits in the outpatient otolaryngology clinic | 1 | <1% |
| Treating specialties last year | 1 | <1% |
| Hospital type | 3 | 1% |
| Hospital location / teaching | 1 | <1% |
| Hospital volume / Annual institutional volume (number of procedures per year) / Number of procedures per surgon | 9 | 4% |
| Hospital size | 5 | 2% |

### Diagnostics

| | n = | % |
|---|---|---|
| Antenatal: amniocentesis / chorionic villous sampling | 2 | 1% |
| Antenatal: EA suspected during prenatal MRI | 2 | 1% |
| Polyhydramnios on antenatal ultrasound | 19 | 9% |
| Antenatal ultrasound: yes or no | 9 | 4% |
| Antenatal ultrasound: absent stomach | 8 | 4% |
| Antenatal ultrasound: upper pouch sign | 3 | 1% |
| Antenatal: EA suspected during prenatal sonography | 3 | 1% |
| Bronchoscopy (intraoperative) | 22 | 11% |
| Bronchoscopy (postoperative) | 3 | 1% |
| Fiberoptic bronchoesophagoscopy-assisted diagnostics / interventions (a wide range) | 3 | 1% |
| Tracheoscopy at some point in time | 3 | 1% |
| BAL | 2 | 1% |
| Age at fiberoptic bronchoesophagoscopy | 1 | <1% |
| Age at first bronchoscopy postoperative | 1 | <1% |
| Number of bronchoscopies | 1 | <1% |
| Contrast study postoperative | 13 | 6% |
| Contrast study (preop) / Prone tube esophagogram (preop, type E) | 5 | 2% |
| Contrast medium swallowing (barium) / Fluoroscopic swallow study | 4 | 2% |
| Contrast study, post-op: time between repair and contrast study | 4 | 2% |
| Contrast study, post-op: routine | 2 | 1% |
| Contrast study: regular follow-up | 1 | <1% |
| Iodized Oil Radiography (preoperative) | 1 | <1% |
| Postoperative iodine oil contrast exam: number of days postoperative | 1 | <1% |
| Postoperative iodine oil contrast exam: yes or no | 1 | <1% |
| Chest CT at some point in time (yes or no) | 4 | 2% |
| Chest CT (preop) | 2 | 1% |
| Echocardiography | 11 | 5% |
| Endoscopy: (first) surveillance / GI series | 6 | 3% |

| | n = | % |
|---|---|---|
| Endoscopy at some point in time (yes or no) | 3 | 1% |
| Endoscopy including pH measurement (m1,m3,m6 and yearly) | 2 | 1% |
| Endoscopy: median age at first endoscopy | 2 | 1% |
| Esophagoscopy / Upper endosopy (preoperative) | 2 | 1% |
| Endoscopy peroperative (type E) | 1 | <1% |
| Endoscopy: conscious sedation | 1 | <1% |
| Endoscopy: surveillance, time between endosocpies | 1 | <1% |
| Time (duration) endoscopic follow-up / Surveillance | 1 | <1% |
| Site of fistula consistent with preoperative examination | 1 | <1% |
| Gap measurement (X-ray, bronchoscopy and bronchoscopy and a rigid insrument) | 3 | 1% |
| Difference between radiographic and intraoperatively measured gap | 1 | <1% |
| Albumin after surgery | 2 | 1% |
| Lab: pCO2 | 2 | 1% |
| Lab: pH | 2 | 1% |
| Albumin / globulin | 1 | <1% |
| Hemoglobin after surgery | 1 | <1% |
| Lab: Hb (preop) | 1 | <1% |
| Lab: hematocrit | 1 | <1% |
| Lab: standard bicarbonate | 1 | <1% |
| Lab: WBC (preop) | 1 | <1% |
| Lymphocyte count | 1 | <1% |
| Neutrophil / Lymphocite Ratio | 1 | <1% |
| Neutrophil count | 1 | <1% |
| Lung function (spirometry) in follow-up | 13 | 6% |
| Body plethysmography | 2 | 1% |
| Spirometry: age at | 1 | <1% |
| Spirometry: diffusion capacity | 1 | <1% |
| Mode of diagnosis: H-type fistula | 1 | <1% |
| MRI performed | 1 | <1% |
| Manometry | 2 | 1% |
| Physical examination | 2 | 1% |
| Age at first pH-metry | 1 | <1% |
| Determination size / volume stomach | 1 | <1% |
| Oral-pharygneal motility study: any aspiration | 1 | <1% |
| Oral-pharyngeal motility study | 1 | <1% |
| Total screening for VACTERL | 1 | <1% |
| pH impedance measures / Ri at / 24h pH monitoring | 9 | 4% |
| Prenatal diagnosis | 26 | 12% |
| Antenatal: counseling with antenatal specialist | 1 | <1% |
| Antenatal: gestational age at prenatal diagnosis | 1 | <1% |
| Antenatal: in utero transfer | 1 | <1% |
| Ultrasound: renal | 4 | 2% |
| Ultrasound: abdominal | 1 | <1% |
| Number of video fluoroscopic feeding studies | 1 | <1% |
| Plain X-ray: chest (with or without nasogastric tube inserted) | 6 | 3% |
| Plain X-ray: abdominal | 1 | <1% |

## Primary treatment

| | n = | % |
|---|---|---|
| Age at operation | 98 | 47% |
| Time between diagnosis and surgery (delay) | 13 | 6% |
| Number of hospital admissions / hospitalizations / hospitalization rate | 8 | 4% |
| Age at diagnosis | 3 | 1% |
| Time (duration) of paralysis | 5 | 2% |

| | n = | % |
|---|---|---|
| Number of episodes of general anaesthesia | 4 | 2% |
| Time (duration) of anaesthesia | 4 | 2% |
| Cumulative time (duration) of anaesthesia (during first two years) | 2 | 1% |
| Mean End-tidal CO2 (EtCO2) at end of surgery | 2 | 1% |
| Mean End-tidal CO2 (EtCO2) at start of surgery | 2 | 1% |
| Mean maximum EtCO2 | 2 | 1% |
| Blood gas: arterial or capillary | 1 | <1% |
| Difficulty weaning from methadone and lorazepam | 1 | <1% |
| Highest heartrate during surgery | 1 | <1% |
| Highest MAP during surgery | 1 | <1% |
| Lowest MAP during surgery | 1 | <1% |
| PaO2 during surgery | 1 | <1% |
| ECMO (yes vs. no) | 3 | 1% |
| Elongation procedure | 19 | 9% |
| Time between beginning Foker / elongation to anastomosis | 6 | 3% |
| Elongation: Loss of traction sutures | 3 | 1% |
| Elongation: age at start Foker / elongation | 2 | 1% |
| Elongation: weight at start Foker | 2 | 1% |
| Elongation, preoperative (techniques) | 1 | <1% |
| Elongation: number of steps | 1 | <1% |
| Foker: primary or rescue | 1 | <1% |
| Gastropexy before elongation | 1 | <1% |
| Time to anastomosis with magnets | 1 | <1% |
| Cervical esophagostomy until surgery / at any point in time | 33 | 16% |
| Time to start oral feeding | 29 | 14% |
| Time to start tube feeding | 14 | 7% |
| Time to full oral feeding | 13 | 6% |
| Method of feeding (TPN, gastric / jejunal via transanas tube / gastrostomy tube) | 8 | 4% |
| Parenteral feeding | 6 | 3% |
| Time (duration) of tube feeding | 6 | 3% |
| Time to full enteral feeding | 5 | 2% |
| Preoperative nutrition | 4 | 2% |
| Time (duration) parenteral feeding | 4 | 2% |
| Time to extubation transanastomotic tube | 4 | 2% |
| Bottle use | 1 | <1% |
| Breast milk taking methods | 1 | <1% |
| Breast milk taking period | 1 | <1% |
| Breast milk: yes or no | 1 | <1% |
| Nasogastric tube at discharge | 1 | <1% |
| Nasogastric tube postoperatively | 1 | <1% |
| Pacifier use | 1 | <1% |
| Tube feeding at time of discharge from initial NICU | 1 | <1% |
| Fistula: undiagnosed TEF | 5 | 2% |
| Gastrostomy at any point in time | 81 | 39% |
| Gastrostomy: age at | 2 | 1% |
| Gastrostomy: time to closure | 2 | 1% |
| Gastrostomy button placement | 1 | <1% |
| Gastrostomy type (image-guided percutaneous vs Stamm surgical) | 1 | <1% |
| Gastrostomy: open versus laparoscopically | 1 | <1% |
| Number of surgeries | 11 | 5% |
| Distal jejunal conduit anastomosis: roux-en-y or straight to stomach | 1 | <1% |
| Length of jejunal conduit | 1 | <1% |
| Time on intensive care (days) | 27 | 13% |
| Time (duration) primary hospital stay | 78 | 37% |
| Age at discharge | 1 | <1% |
| Use of anti-acid medication (at any point in time) | 61 | 29% |
| Medication: anti-acid, duration | 3 | 1% |
| Physiotherapy / Physical therapy | 3 | 1% |
| Speech pathologists | 2 | 1% |
| Cannulation of the TEF tract (preoperative) | 3 | 1% |

| | n = | % |
|---|---|---|
| Medication: (perioperative) steroiduse | 2 | 1% |
| Fasting time | 1 | <1% |
| Incidence of TAT dislogdment (re-intubation) | 1 | <1% |
| Medication: antibiotic profylaxis | 4 | 2% |
| Medication: vasopressors, intraoperative | 2 | 1% |
| Medication: vasopressors, preoperative | 2 | 1% |
| Mode of blood pressure measurement | 1 | <1% |
| Medication: continuous muscle relaxation postoperatively / Neuromuscular blockade | 3 | 1% |
| Medication: extension of postoperative antibiotics | 2 | 1% |
| Medication: inotrope support / Vasopressor | 2 | 1% |
| Medication: vasopressors, postoperative | 2 | 1% |
| Medication: catecholamine use | 1 | <1% |
| Medication: coagulation factor XIII postoperative | 1 | <1% |
| Medication: duration of analgesia | 1 | <1% |
| Medication: type of analgesia | 1 | <1% |
| Preoperative nasoesophageal replogle | 2 | 1% |
| Duration hospital stay preoperative | 1 | <1% |
| Home management before definitive repair with portable suction | 1 | <1% |
| Jejunostomy | 6 | 3% |
| Cervical esophagostomy: right or left sided | 1 | <1% |
| Colostomy | 1 | <1% |
| Duodenoduodenostomy | 1 | <1% |
| Time to closure jejunostomy | 1 | <1% |
| Type of repair (primary, secondary, anastomosis/interposition) | 125 | 6<1 % |
| Thoracotomy or thoracoscopy | 79 | 38% |
| Operation time/duration | 37 | 18% |
| Conversion -scopy to -tomy | 29 | 14% |
| Tension-free anastomosis / Concern regarding tension | 27 | 13% |
| Intra-operative chest tube | 23 | 11% |
| Transanastomotic tube | 21 | 1<1 % |
| Thoracotomy: left or right approach | 12 | 6% |
| Thoracotomy: surgical approach (axillary, lateral, pleural / extrapleural) | 7 | 3% |
| Experience of surgeon | 5 | 2% |
| Azygos vein: division (yes or no) | 4 | 2% |
| Interposition material between esophageal and tracheal suture lines | 4 | 2% |
| Number of surgeons | 4 | 2% |
| Anastomosis: type of sutures | 3 | 1% |
| Conversion: causes for conversion | 3 | 1% |
| Emergency procedure | 3 | 1% |
| Interposition material (autologous versus synthetic) | 3 | 1% |
| Number of surgeries until anastomosis | 3 | 1% |
| Number of thoracotomies | 3 | 1% |
| TEF: cervical approach (fistula) | 3 | 1% |
| Anastomosis: number of sutures | 2 | 1% |
| Esophageal replacement after first surgery | 2 | 1% |
| Fistula: suture ligated OR transfixed and divided (type E) | 2 | 1% |
| Jejunal interposition with supercharge of a and v mammaria interna | 2 | 1% |
| Livaditis myotomy | 2 | 1% |
| TEF ligation: type of closure (sutures, clips); fistula | 2 | 1% |
| Thoracotomy: location of skin incision | 2 | 1% |
| Thoracotomy: muscle sparing | 2 | 1% |
| Time to fistula closure | 2 | 1% |
| Timing esophageal replacement | 2 | 1% |

| | n = | % |
|---|---|---|
| Atraumatic microvascular clamp: application time | 1 | <1% |
| Chest tube: extrapleural versus intrapleural | 1 | <1% |
| Conversion extrapleural to transpleural | 1 | <1% |
| Conversion left thoracotomy to right thoracotomy | 1 | <1% |
| Date of primary surgery | 1 | <1% |
| Difficult anastomosis | 1 | <1% |
| End-to-end / side-to-end | 1 | <1% |
| Fistula: suture ligated OR transfixed and divided (type E) | 1 | <1% |
| Incision length | 1 | <1% |
| Lower pouch mobilisation | 1 | <1% |
| Operation on weekday or weekendday | 1 | <1% |
| Serratus anterior status (division vs. sparing) | 1 | <1% |
| Sternotomy | 1 | <1% |
| Surgery: technique | 1 | <1% |
| Sutures: type of intercostal | 1 | <1% |
| TEF: age at closure | 1 | <1% |
| TEF: age at diagnosis | 1 | <1% |
| Thoracotomy: intercostal incision (periostal vs muscle section) | 1 | <1% |
| Time to reaching pleural cavity by the surgeon | 1 | <1% |
| Upper pouch mobilisation | 1 | <1% |
| Use of endoscopic clips | 1 | <1% |
| Stabilization time before surgery | 1 | <1% |
| Ventilation period / Duration of ventilation | 64 | 31% |
| Need for preoperative intubation/ventilation | 19 | 9% |
| Need for postoperative ventilation | 9 | 4% |
| Re-intubation | 6 | 3% |
| Oxygen support | 4 | 2% |
| Postoperative mechanical venitilation / intubation(yes or no) | 4 | 2% |
| Time (days) on ventilator, initial | 4 | 2% |
| CPAP duration after intubation | 2 | 1% |
| Ventilation: extubated from the OR | 2 | 1% |
| CPAP after intubation | 1 | <1% |
| CPAP time from repair to when CPAP was commenced | 1 | <1% |
| Indication for re-intubation | 1 | <1% |
| Intubation: repeated oro-tracheal (number of) | 1 | <1% |
| Need for intensive respiratory support | 1 | <1% |
| Number of intubated days after reintubation before final extubation | 1 | <1% |
| Number of times (periods) on ventilation | 1 | <1% |
| Oxygen support: duration | 1 | <1% |
| Post-operative paralysis, ventilation and neck flexion: yes or no | 1 | <1% |
| Reintubation: unplanned | 1 | <1% |
| Route of intubation | 1 | <1% |
| Single-lung ventilation | 1 | <1% |
| Time (duration) of ventilation prior to fistula ligation | 1 | <1% |
| Total reintubation episodes | 1 | <1% |
| Ventilation: postoperative mode | 1 | <1% |
| Ventilation: preoperative mode | 1 | <1% |
| Chest tube: required second / post-operative placement / emergency | 8 | 4% |
| Time (duration) IOCT / Chest tube | 8 | 4% |
| Parents receiving sufficient information during inpatient stay | 1 | <1% |
| Parents referred to additional information sources | 1 | <1% |

## Treatment of comorbidities

| | n = | % |
|---|---|---|
| Surgeries for associated anomalies | 9 | 4% |
| Cardiac surgical correction | 6 | 3% |
| Pylorotomy / pyloroplasty | 5 | 2% |
| Surgical intervention bij ENT specialist | 2 | 1% |
| Musculoskeletal deformities, requiring active treatment | 1 | <1% |
| Number of abdominal surgeries | 1 | <1% |
| Number of limb surgeries | 1 | <1% |
| Number of urological surgeries | 1 | <1% |
| Surgery for ARM | 1 | <1% |
| Surgery for scoliosis / chest wall deformity / winged scapula | 1 | <1% |

## Treatment of complications

| | n = | % |
|---|---|---|
| Number of eVAC changes | 1 | <1% |
| Total eVAC duration | 1 | <1% |
| Number of dilatations | 74 | 35% |
| Stricture: placement of stent | 7 | 3% |
| Stricture: resection | 7 | 3% |
| Dilatation: technique | 6 | 3% |
| Dilatations: age at first | 6 | 3% |
| Time to first dilatation | 5 | 2% |
| Dilatations: number of at first year | 3 | 1% |
| Dilatations: period of repeated dilatations (mean) | 3 | 1% |
| Stricture, recalcitrant: steroid injections intralesional | 3 | 1% |
| Dilatation: time during which dilatations were required | 2 | 1% |
| Number of dilatations during follow-up | 2 | 1% |
| Stricture, recalcitrant: timing of resection | 2 | 1% |
| Admission for complicated dilatation: length of hospital stay | 1 | <1% |
| Age at which there was a complication of dilatation | 1 | <1% |
| Dilatation: diameter of dilation procedure | 1 | <1% |
| Number of intralesional steroid injections performed | 1 | <1% |
| Planned dilatation before discharge | 1 | <1% |
| Stenosis, esophageal: treatment for (Yes vs. No) | 1 | <1% |
| Stent postoperative | 1 | <1% |
| Stricture, recalcitrant: electrocautery incisional therapy | 1 | <1% |
| Stricture, recalcitrant: resection technique | 1 | <1% |
| Time between subsequent dilatations | 1 | <1% |
| Time between surgery and anastomotic stricture | 1 | <1% |
| Graft removal | 2 | 1% |
| Dilatation for congenital esophageal stenosis | 1 | <1% |
| Gastric transposition: pyloric dilatations | 1 | <1% |
| rTEF closure: endoluminal methods | 4 | 2% |
| rTEF: attempted procedures prior to referral | 1 | <1% |
| Fundoplication: age at operation | 8 | 4% |
| Fundoplication: redo | 3 | 1% |
| Age at redo fundoplication | 1 | <1% |
| Antireflux surgery: number of surgeries required | 1 | <1% |
| Tracheostomy | 27 | 13% |
| Aortopexy: age at aortopexy | 2 | 1% |
| Tracheomalacia: tracheal stent | 2 | 1% |
| Aortopexy: operative approach | 1 | <1% |
| Aortopexy: redo | 1 | <1% |
| Tests to diagnose tracheomalacia | 1 | <1% |
| Tracheomalacia: time between first symptoms and investigation | 1 | <1% |
| Tracheostomy: age at procedure | 1 | <1% |

## Treatment of long-term morbidity

| | n = | % |
|---|---|---|
| Eosinophilic esophagitis: treatment | 2 | 1% |
| Age at laryngotracheoplasty | 1 | <1% |
| Laryngotracheoplasty | 1 | <1% |
| Use of inhalation medication | 12 | 6% |
| Medication: prokinetics / promotility | 4 | 2% |
| Medication: antibiotics on regular basis | 3 | 1% |
| Medication: regular medicine use | 2 | 1% |
| Medication: antibiotics (chronic treatment, macrolide) | 1 | <1% |
| Occupational therapy | 1 | <1% |
| Elimination diet (because of esophagitis) | 1 | <1% |
| Age at asthma diagnosis | 1 | <1% |
| Airway clearance techniques as part of daily routine | 1 | <1% |
| Age at which severe psychological stress was reported | 1 | <1% |
| Duration of follow-up | 82 | 39% |
| Visit to allergy consultant | 1 | <1% |
| Visit to ENT-doctor | 1 | <1% |
| Currently under care | 1 | <1% |
| Vaccination status | 1 | <1% |

## Readmission and reoperation

| | | |
|---|---|---|
| Time spent in hospital during first year / first five years | 4 | 2% |
| Readmission: cause | 2 | 1% |
| Readmission: number of | 2 | 1% |
| Re-admissions (total duration) | 2 | 1% |
| Readmission: intensive care unit | 1 | <1% |
| Readmission: unplanned | 1 | <1% |
| Reoperation: surgical method (fistula) | 2 | 1% |
| Reoperation: duration IOCT (fistula) | 1 | <1% |
| Reoperation: duration of hospital stay (fistula) | 1 | <1% |
| Reoperation: duration postop ventilation (fistula) | 1 | <1% |
| Reoperation: operating time (fistula) | 1 | <1% |
| Reoperation: unplanned | 2 | 1% |
| Reoperation: age at | 1 | <1% |
| Reoperation: elective | 1 | <1% |

## SUPPLEMENTARY 5: Extracted outcomes

*As several parameters could arguably be included in more than one category, categorization followed agreement between the first two authors. We further arranged the parameters by topic, such as comorbidities, primary treatment, specific complications and long-term outcome, to facilitate the comparison of variation in studied parameters within similar subjects. Underlined items were studied in more than 5% of included publications.

### Complications

| | n = | % |
|---|---|---|
| Anastomotic leakage | 143 | 68% |
| Anastomotic dehiscence | 8 | 4% |
| Anastomotic leak: time to settlement conservative | 3 | 1% |
| Anastomotic leak requiring reintervention | 2 | 1% |
| Anastomotic leakage: duration until onset | 2 | 1% |
| Esophageal continuity at discharge | 2 | 1% |
| Anastomotic leakage: contents of leak | 1 | <1% |
| Anastomotic leakage: stopped, decreasing or persistent | 1 | <1% |
| Anastomotic leakage: volume of leak per day | 1 | <1% |
| Long term anastomotic failure | 1 | <1% |
| Technical failure of the eVAC | 1 | <1% |
| Thoracic drainage volume | 1 | <1% |
| Anastomotic stricture/stenosis | 150 | 72% |
| Dilatations: yes or no | 128 | 61% |
| Refractory stricture | 3 | 1% |
| Stricture, dilatation-resistent and indication for revision | 3 | 1% |
| Stricture: anastomotic stricture index | 3 | 1% |
| Stricture: before first year | 3 | 1% |
| Bougienage required | 2 | 1% |
| Stricture: recurrent anastomotic stricture | 2 | 1% |
| Dilatation, Complication: clinically-significant aspiration episodes | 1 | <1% |
| Dilatation: tight stricture (yes or no) | 1 | <1% |
| Esophageal stent erosion | 1 | <1% |
| Peptic stricture | 1 | <1% |
| Result of dilatation | 1 | <1% |
| Stricture index, endoscopically measured | 1 | <1% |
| Stricture index, radiologically measured | 1 | <1% |
| Stricture: ability to pass an endoscope | 1 | <1% |
| Dilatation for anastomotic stricture | 1 | <1% |
| Wound issues | 20 | 1<1 % |
| Esophageal perforation after dilatation | 11 | 5% |
| Esophagitis | 9 | 4% |
| Barrett's oesophagus | 7 | 3% |
| Esophageal diverticulum | 4 | 2% |
| Perforation, esophageal | 4 | 2% |
| Achalasia | 2 | 1% |
| Esophageal varices | 2 | 1% |
| Columnar-lined esophagus | 1 | <1% |
| Dilated proximal esophagus | 1 | <1% |
| Ulcer / Gastric bleeding | 9 | 4% |
| Adhesional small bowel obstruction / Ileus | 4 | 2% |
| Hiatal hernia | 3 | 1% |
| Perforation, duodenal | 2 | 1% |
| Perforation, gastric | 2 | 1% |
| Abdominal evisceration | 1 | <1% |
| Pneumatosis of ascending colon | 1 | <1% |
| Pyloric stenosis | 1 | <1% |
| Short bowel syndrome | 1 | <1% |
| Time between surgery and adhesive bowel obstruction / ileus | 1 | <1% |
| Gastrostomy-related complication | 3 | 1% |
| Complication: absent/present | 14 | 7% |
| Number of complications | 5 | 2% |
| Other complication (unspecified) | 3 | 1% |

| | n = | % |
|---|---|---|
| Histopathologically proven complication | 2 | 1% |
| Incidence of 30-day Complication | 2 | 1% |
| Complication of elongation | 1 | <1% |
| Complication: clinically serious | 1 | <1% |
| Number of complications > Clavien Dindo 3b | 1 | <1% |
| Short-term complications | 1 | <1% |
| Time to first complication | 1 | <1% |
| Graft necrosis / Graft failure / Graft loss | 15 | 7% |
| Perforation jejunal graft | 3 | 1% |
| Degree of conduit tortuosity | 1 | <1% |
| DVT / thromobosis / trombosis / VTE | 5 | 2% |
| Cardiac arrest | 1 | <1% |
| Cardiac complication | 1 | <1% |
| Pericardial effusion | 1 | <1% |
| Anemia | 2 | 1% |
| Hemodynamic instability, postoperative | 1 | <1% |
| Sepsis | 43 | 21% |
| Shock (also septic shock) | 4 | 2% |
| Infections | 3 | 1% |
| Urinary tract infection | 3 | 1% |
| Complication (intra-operative) | 11 | 5% |
| Mediastinitis | 6 | 3% |
| Elongation: mediastinitis | 1 | <1% |
| Mediastinal abcess | 1 | <1% |
| Mediastinal emphysema | 1 | <1% |
| Mediastinitis after esophageal elongation | 1 | <1% |
| Intracranial hemorrhage (also preoperative) | 8 | 4% |
| Bilirubin encephalopathy | 1 | <1% |
| Complication: neurologic | 1 | <1% |
| Blood loss | 22 | 11% |
| Multi-system organ failure | 5 | 2% |
| Horners syndrome (transient) | 3 | 1% |
| Aberrant subclavian artery fistula | 2 | 1% |

| | n = | % |
|---|---|---|
| Aortic injury | 2 | 1% |
| Fractures | 2 | 1% |
| Hypotension requiring fluid resuscitation | 2 | 1% |
| Left recurrent laryngeal nerve injury | 2 | 1% |
| Acute otitis media (recurrent) | 1 | <1% |
| Anatomic ridge / shelft | 1 | <1% |
| Diaphragmatic paresis: transient | 1 | <1% |
| Functional outcome shoulder | 1 | <1% |
| Hypertension | 1 | <1% |
| Phrenic nerve injury | 1 | <1% |
| Sliding hernia | 1 | <1% |
| Recurrent fistula | 84 | 4<1 % |
| Anastomotic fistula | 2 | 1% |
| rTEF: number recurrences of the TEF | 1 | <1% |
| Gastrooesophageal reflux | 110 | 53% |
| Anti-reflux surgery: yes or no | 88 | 42% |
| Dysplasia, esophageal or gastric | 5 | 2% |
| Esophagitis, peptic | 4 | 2% |
| Esophageal carcinoma / cancer | 2 | 1% |
| Fundoplication: time between EA repair and fundoplication | 2 | 1% |
| Longest reflux time (min) | 1 | <1% |
| Reflux index | 1 | <1% |
| Reflux with normal biopsy | 1 | <1% |
| Reflux: number of nonacid reflux per day | 1 | <1% |
| Reflux: number of reflux >5min per hour | 1 | <1% |
| Reflux: number of reflux per hour | 1 | <1% |
| Renal complication | 1 | <1% |
| Respiratory complication / symptoms / chronic disease | 60 | 29% |
| Pneumothorax | 36 | 17% |
| Chylothorax | 19 | 9% |
| Respiratory failure | 6 | 3% |
| Aspiration syndrome / Aspiration | 4 | 2% |
| Pleural effusion | 3 | 1% |

| | n = | % | | n = | % |
|---|---|---|---|---|---|
| Diverticulum of the trachea | 2 | 1% | Tracheal narrowing | 1 | <1% |
| Empyema | 2 | 1% | Tracheomalacia: presenting signs and symptoms | 1 | <1% |
| Aspiration: recurrent foreign body | 1 | <1% | Aortopexy: yes or no | 33 | 16% |
| Lung collapse (postoperative) | 1 | <1% | Aortopexy: additional procedures to open airway | 2 | 1% |
| Pulmonary hemorrhage | 1 | <1% | Tracheomalacia: time between EA repair and first symptoms | 1 | <1% |
| Respiratory arrest | 1 | <1% | Tracheopexy (performed, yes or no) | 1 | <1% |
| Jejunostomy problems | 2 | 1% | Complication related to re-intubation | 1 | <1% |
| Stoma Complication | 1 | <1% | Ventilation: intraoperative ventilatory Complication | 1 | <1% |
| Tracheomalacia | 63 | 3<1 % | | | |
| Vocal cord issues / Voice changing | 28 | 13% | | | |
| Severity of tracheomalacia | 1 | <1% | | | |

## Readmission and reoperation

| | n = | % | | n = | % |
|---|---|---|---|---|---|
| Readmission | 16 | 8% | Reoperation (esophageal) | 80 | 38% |
| Anastomotic leakage: reoperation | 1 | <1% | Time between primary repair and reoperation | 1 | <1% |
| Foker: reoperation due to leak while on traction | 1 | <1% | | | |

## Growth

| | n = | % | | n = | % |
|---|---|---|---|---|---|
| Undernourished / Undernutrition / Malnourished / Malnutrition | 4 | 2% | Height at time of filling in questionnaire / intervention / time of follow-up | 3 | 1% |
| Nutritional status at 1y | 2 | 1% | Perioperative weight change | 1 | <1% |
| Growth / Weight / Failure to thrive | 61 | 29% | | | |
| Weight at time of filling in questionnaire/intervention/time of follow-up | 8 | 4% | | | |

## Morbidity

| | n = | % | | n = | % |
|---|---|---|---|---|---|
| Diameter of anastomotic opening (cm) | 4 | 2% | Intelligence (Wechsler Intelligence Scale for children (WISC-III-NL)) | 2 | 1% |
| Stricture: acute food bolus impaction | 1 | <1% | Start school education at time of questionnaire/intervention/follow-up | 2 | 1% |
| Behavior | 3 | 1% | Academic skills (WRAT-4) | 1 | <1% |
| Parent-reported attention deficit hyperactivity disorder | 1 | <1% | Attention/language (WPPSI \| NEPSY-II / TEA-Ch) | 1 | <1% |
| Parent-reported autism spectrum disorder | 1 | <1% | Cognitive problems | 1 | <1% |
| | | | Daily executive functioning (proxy-reported) | 1 | <1% |

| | n = | % |
|---|---|---|
| Executive functioning (NEPSY-II) | 1 | <1% |
| Intellectual functioning (WPPSI-III/WISC) | 1 | <1% |
| Intellectual levels (ADSI scale) | 1 | <1% |
| Memory (CMS) | 1 | <1% |
| Revised Amsterdam Intelligence Test (RAKIT) | 1 | <1% |
| Motor/neuro- development | 13 | 6% |
| Dysphagia / Swallowing difficulties | 52 | 25% |
| Eosinophilic esophagitis | 10 | 5% |
| Bolus impactions requiring endoscopic intervention | 5 | 2% |
| Choking: number of episodes a week | 1 | <1% |
| Delayed emptying of the esophagus | 1 | <1% |
| Endoscopy: active inflammation | 1 | <1% |
| Esophagitis, erosive / ulcerative | 1 | <1% |
| Tolerated level of food texture (International Dysphagia Diet Standardization Initiative (IDDSI)) | 1 | <1% |
| Oral feeding issues | 61 | 29% |
| Functional intake | 7 | 3% |
| All oral intake at 1 year | 2 | 1% |
| Age when eating seemed to be enjoyed | 1 | <1% |
| Age when eating solid food was properly managed | 1 | <1% |
| Chewing function (Karaduman Chewing Performance Scale (KCPS)) | 1 | <1% |
| Consuming blenderized and mashed food | 1 | <1% |
| Diet habits | 1 | <1% |
| Eating outcomes at 3 years of age | 1 | <1% |
| Mealtime behaviors | 1 | <1% |
| Nutrient delivery | 1 | <1% |
| Parental anxiety during mealtime | 1 | <1% |
| Penetration and aspiration (Penetration and Aspiration Scale) | 1 | <1% |
| Reliant on tube feeding to some degree at one year | 1 | <1% |

| | n = | % |
|---|---|---|
| Gastro-intestinal symptoms | 23 | 11% |
| Endoscopy: gastric and esophageal metaplasia | 8 | 4% |
| Delayed emptying of the stomach | 6 | 3% |
| Dumping | 6 | 3% |
| Gastroesophageal dismotility | 3 | 1% |
| Choking | 2 | 1% |
| Gastric Outlet Obstruction | 2 | 1% |
| Gastric retention | 1 | <1% |
| Gastrointestinal symptoms (Gastrointestinal Symptom Rating Scale, GSRS) | 1 | <1% |
| Gastrostomy tube at 1 year | 1 | <1% |
| Gastrostomy tube at discharge | 1 | <1% |
| Delayed transit of jejunal conduit | 1 | <1% |
| Health status (German Health Survey for Children and Adolescents (KiGGS)) | 2 | 1% |
| Mental and psychosocial health (SDQ-20) | 1 | <1% |
| Laryngomalacia | 3 | 1% |
| Mannitol challenge test: positive result | 1 | <1% |
| Metacholine challenge test: bronchial hyperresponsiveness | 1 | <1% |
| Spirometry: reduced respiratory capacity | 1 | <1% |
| Coping (Coping Strategy Checklist) | 1 | <1% |
| Traumatic stress (IES-13) | 1 | <1% |
| Chest wall deformity | 19 | 9% |
| Dental problems | 1 | <1% |
| Erosive teeth wear | 1 | <1% |
| Halitosis | 1 | <1% |
| Oral hygiene | 1 | <1% |
| Elevated / Winged scapula | 4 | 2% |
| Subglottic stenosis (postoperative) | 4 | 2% |
| BRUEs | 2 | 1% |
| Sleep disorders | 2 | 1% |
| Depression | 1 | <1% |
| Horner syndrome | 1 | <1% |

| | n = | % |
|---|---|---|
| Exercise capacity / intolerance (Bruce protocol) | 4 | 2% |
| Participation in sports | 1 | <1% |
| Quality of Life | 16 | 8% |
| Pneumonia | 57 | 27% |
| Recurrent respiratory infections | 38 | 18% |
| ALTE / Cyanotic spells / Cyanosis | 7 | 3% |
| Spirometry: obstructive ventilatory impairment | 5 | 2% |
| Bronchiectasis | 4 | 2% |
| Lung atelectasis | 4 | 2% |
| Spirometry: restrictive ventilatory defect / impairment | 4 | 2% |
| Bronchomalacia | 3 | 1% |
| Hospital admission for respiratory tract infections | 3 | 1% |
| Spirometry: reversible airways obstruction | 3 | 1% |
| Asthma | 2 | 1% |
| Chest infections | 2 | 1% |
| Pulmonary function impairment (obstructive and / or restrictive and / or impaired DLCO) | 2 | 1% |
| Tracheal vascular compression | 2 | 1% |
| Aspiration risk | 1 | <1% |
| Blind ending fistula stump on fiberbronchoscopy | 1 | <1% |
| Bronchitis | 1 | <1% |
| Mosaic perfusion on chest CT | 1 | <1% |
| Pneumonia: number of episodes | 1 | <1% |
| Pneumonitis | 1 | <1% |
| Prolonged respiratory infection | 1 | <1% |
| Purulent secretion in main bronchi on fiberbronchoscopy | 1 | <1% |
| Respiratory tract infections: number of hospitalizations | 1 | <1% |
| Social maturity ((Modified) Vineland Social Maturity Scale) | 2 | 1% |
| Gastrojejunostomytube at 1 year | 1 | <1% |
| Amount of psychological stress for patients and their families | 1 | <1% |
| Maternal stress (Parental stress scale) | 1 | <1% |

## Mortality

| | n = | % |
|---|---|---|
| Mortality | 137 | 66% |
| Survival | 6 | 3% |
| Age at death | 3 | 1% |
| In-hospital death | 1 | <1% |
| Time between surgery and death | 1 | <1% |
| Adolescents knowledge of care and transition | 1 | <1% |
| Parents' transition-specific knowledge | 1 | <1% |

## Other

| | n = | % |
|---|---|---|
| Cosmetic Result | 6 | 3% |
| Hospital expenses / Cost | 4 | 2% |
| Feeding at discharge (oral versus NJT or combination or parenteral) | 8 | 4% |
| Inability to be fed orally by end of the first month | 1 | <1% |
| Time to shoulder function recovery (days) | 1 | <1% |
| Returning the Moro refex (1m, 3m) | 1 | <1% |
| Number of medical appliances needed after discharge (feeding, respiratory, stoma) | 1 | <1% |
| Adolescents commitment to own care (Patient Activation Measure-13D ) | 1 | <1% |
| Patient satisfaction with transition programme (ZUF-8) | 1 | <1% |